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THE ROYAL NAVY

LORD NELSON, ABOUT 1802.

(AFTER BEECHEY; DUKE OF WELLINGTON COLLECTION.)

Frontispiece.

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THE ROYAL NAVY

THE SURE SHIELD OF THE EMPIRE

86196

BY

GEOFFREY PARRATT

WITH A FOREWORD BY

VICE-ADMIRAL J. E. T. HARPER, C.B., M.V.O.

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DEDICATED

TO

ADMIRAL-OF-THE-FLEET EARL JELLICOE,

O.M., G.C.B., G.C.V.O., D.C.L., LL.D.

COMMANDER-IN-CHIEF OF THE GRAND FLEET,
1914-1916.

FIRST SEA LORD,
1916-1917.

FOREWORD

By VICE-ADMIRAL J. E. T. HARPER, C.B., M.V.O.

It is meet that, from time to time, the British public should be reminded of the debt this country and our world-wide Empire owes to those "who go down to the sea in ships and occupy their business in great waters."

Books connected with the sea have ever appealed to our Island people, and because the activities of the Royal Navy are ubiquitous and multifarious, books on this phase of sea life appeal, perhaps, more to the popular imagination than those which deal with the somewhat more prosaic, but no less important, work of the Mercantile Navy.

Our great Empire is an outstanding example of what can be created by sea power, and by sea power it must be maintained. Fortunate indeed are we to have a population still endowed, as our forefathers were endowed, with sea sense and sea courage. Sea power will be necessary to our existence in this country so long as goods are transported by sea. Sea power, be it noted, does not rest solely on our Royal Navy: the very foundation of sea power is in the Merchant Navy; a country which has no mercantile marine has not, and cannot have, sea power, or power derived from the sea.

It is not to our Navy only that the people of this country should look for a "sure shield," but to those

gallant men who man our merchant ships. Without the invaluable assistance of their comrades of the Merchant Navy, who never allowed enemy menace to deviate them from their allotted tasks, the measures so ably described in the pages which follow, by which the Navy conquered the gravest danger which has ever faced our Empire, would have been as naught.

Our prosperity—aye, our very existence in this country—depends on the highways of the ocean being kept safe both in peace and war. The cruiser force necessary to guard these Empire trade routes cannot be measured by the size of the navy of a potential enemy. In time of war precautions must be taken to frustrate an attack on any or every part of the 85,000 miles of trade routes, and in peace time our warships must be distributed about the world in such manner that England's sons in outlying parts of the Empire can feel a sense of security which is analogous to that felt by those in our towns owing to the presence of the police. Further, this peace distribution ensures security when the war-clouds gather, and if, unfortunately, war cannot be avoided, it assists us to obtain command of the sea at the earliest moment, without which we could not prosecute a war.

This term "command of the sea" has no meaning except in war; in times of peace the seas are free to all, or should be so with the exception of a few local hindrances, and no nation can claim possession. But in time of war a nation which exists by the sea must be strong enough at sea to ensure the safe transport of its own ships, or it will cease to exist as a nation. The mere fact that for over four years our Navy main-

tained free communications by sea when faced by problems which were never foreseen, and could not have been foreseen, shows that during the Great War we had command of the sea, although no opportunity occurred to actually destroy the main fleet of the enemy. That no such opportunity presented itself was no fault of that great little Admiral to whom this volume is dedicated and to whom the nation owes a debt of gratitude which can only inadequately be expressed. Given the opportunity (and the opportunity might have been there on May 31, 1916, if the weather had remained clear), there is no shadow of doubt that Admiral Jellicoe would have achieved his main object—the destruction of the High Seas Fleet—and he would have then been hailed as a national hero. Instead of which the adverse weather conditions, being all in favour of the weaker fleet, which wished to avoid battle, made it possible for him to attain only the next important object—the "containing" of the enemy battle fleet in harbour, where its activities were rigidly curtailed. Even so this ensured us the continued command of the sea, without which we would have been unable to continue the war for a week.

Instead, therefore, of being hailed, at the moment, as a national hero, it required time (but the time was short as history is reckoned) for the public to realize the success attained by Admiral Jellicoe on that day when the whole issue of the war hung in the balance.

J. E. T. H.

INTRODUCTION

Every civilized person is bound to hope with all his heart for world peace, not merely "peace in our time," as the prayer too moderately puts it, but in all times. Anyone who helps to provoke war or fails to seek peace actively is a criminal. We hope that the days of war for mere personal glory or conquest are gone, and that we may reach a state in which both parties in a dispute will exclude war as a means of settlement altogether from their minds.

There are many, however, who agree with peace-producing movements, yet think that we are dangerously forgetting the pre-war years when, we learn, the pacific Liberal Cabinet "could form no theory of the German policy which fitted all the known facts except that they wanted war" (Mr. Asquith to Lord Lansdowne in 1908). The Great War was only the latest in a long history of clashing ideals and policies.

Now there is a lot of human nature in man; there is much force in the swing of the pendulum of human movement, and a generation is springing up which knows nothing of the horror of war or of war weariness. We see on several sides that national ambitions are not dead. Can we therefore count on the continuance always, everywhere, and by everyone of peaceful methods and policy?

National aspirations and policies will clash in the future as in the past, and all our efforts may fail to reconcile them. Are we sure that no nation will assume the rôle of world bully as the Romans, the French, and the Germans successively did? It is not

big armaments that produce war, but the aggressive spirit behind one side or the other, and there is still such a thing as a righteous cause.

Armaments, whether naval or military or air, are bound to be costly, and should be kept down to the limit of reasonable security. So far schemes for limiting armaments have been confined to navies alone, and we British, living on a small island or in a remote part of the globe, have to remember that our Navy is our main shield—in fact, practically our only one.

For any country the first two requisites are peace and security, and security comes before comfort and luxury. Great Britain, alone of all the Great Powers, can be starved into complete and abject surrender by defeat at sea without a man being landed on our shores, and no army, no air force, however powerful, could save us. The various parts of the Empire, cut off from us and from each other, would share in the crash.

We are sometimes told that the next war will be decided by air forces, but though aircraft are still comparatively novel and undeveloped, there is still no sign that the maintenance of communications, on which we rely for our daily bread, will not rest as before on the "Navy, whereon, under the good providence of God, the Safety, Honour, and Welfare of the realm chiefly depend."

This book has been written in the hope that it may show some of the present generation what the Navy has meant to the British Empire from the earliest days and throughout the Great War.

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THE ROYAL NAVY

CHAPTER I

NAVAL WARFARE

"He that commands the sea is at great liberty, and may take as much and as little of the war as he will."—FRANCIS BACON.

THE British Navy exists to protect the Empire, and it can only do this if it is strong enough and wages war on sound principles. The "canker of a long peace" always brings with it a suggestion that war can never come again and that a navy is a luxury. When war comes the fact which immediately stares the nation in the face is that security comes first and comfort second; an efficient navy is the insurance premium paid to ensure security.

The Navy must be able—

Defensive
1. To preserve the Empire's sea-borne trade, without which many of its integral parts cannot exist.
2. To secure the Empire's territory from sea-borne invasion and raid.

Offensive
3. To capture or destroy the enemy's sea-borne trade.
4. To enable our land and air forces to operate in any required theatre of war overseas.

It is obvious that the first two are vital; the third probably accompanies them, and, unless the enemy can be quickly subdued by blockade, the fourth is highly desirable. On the other hand, the head-quarters of the British Empire being an island and

unable to produce enough food for its own needs, the enemy need only cut off Britain's overseas trade in order to starve her out in a very short time without landing a man or a gun. It follows that the British Empire, scattered as it is, more than any other great Power, depends on a strong navy for its bare existence, also that it needs a big army less than a Continental Power exposed to direct invasion by land.

The first three objects are best attained by seeking out and destroying the enemy's naval forces, and ability to do this depends on the willingness of those forces to come out and give battle. Ships have never been a match for forts, since even armoured and mobile ships are in comparison very vulnerable, and ships built for sea fighting do not carry guns well suited for smashing forts by high-angle fire. Moreover, the submarine, torpedo craft, and mine are all on the side of the defence, and can do no harm to forts ashore. A superior fleet may therefore be able to confine a weaker to its harbours, but cannot, if those harbours are well defended, force it to come out. The British Navy in the past has sometimes adopted the policy of close blockade—*i.e.,* it has bottled up the enemy in his harbours—but more often it has kept watch outside, sometimes for years at a stretch, in order to tempt him out and destroy him in the open sea. The former may be the cheaper, but the latter is the more decisive. Nelson replied with polite indignation to the congratulations of the Lord Mayor of London on his success in bottling up the French fleet that he had done nothing of the sort—"quite the reverse; every opportunity has been

offered to the enemy to put to sea, for it is there that we hope to realize the hopes and expectations of our country." He was not so foolish as to sail into Toulon after them, though on another occasion he sailed in elsewhere under very different circumstances, without having to reckon on strong fortifications.

In the old sailing-ship days it was possible for a fleet to cruise close to a blockaded port, the big ships outside and smaller fast ships close in; but the advent of the torpedo has changed all that. Torpedo craft, submarines, and aircraft, it is true, are most dangerous at night, but the submarine is deadly also in the daytime in confined spaces; and while the surface craft has to trust to speed and small size for escape, the submarine can sink out of sight almost at once, and can stay on the bottom for many hours. So in present conditions the battle fleet must either rest in some anchorage beyond the range of torpedo craft and submarines or inside that range if well protected, or it must cruise at speed covered by light cruisers and destroyers. Wherefore close blockade seems to be impossible in these days, and the stronger fleet will maintain a watch from some point from which it can, on getting news from its smaller craft stationed near the enemy's base, meet or cut off the weaker if it comes out.

The advantage of the weaker, home-staying fleet lies in the many chances of sinking single ships by torpedo and thus levelling the fleets, also in the far greater wear and tear to which the sea-keeping fleet is subject. Its disadvantage is the moral one of inaction and conscious, if unconfessed, inferiority. The art of

all war, both naval and military, lies in disposing your forces so as to be superior in strength to your adversary at the right time and place, but superiority in material strength must be accompanied by at least equality in effort and skill. The British Empire can never afford to take up the rôle of the weaker, since its food would be at once cut off from the sea by the Power that had command of the sea routes. Besides the great strain that the weaker "fleet in being" imposes on the stronger sea-keeping fleet, it probably has some hope of attracting an ally with which it can act in concert, but once it has come out and been destroyed any fresh ally must act alone.

That great Admiral, Sir Geoffrey Hornby, said: "I consider that I have command of the sea when I am able to tell my Government that they can move an expedition to any point without fear of interference from an enemy's fleet."

Command at Sea. Take a map of the world, and look at the British Empire. One is struck, first of all, with the gigantic size of it, then with its variety, and lastly, perhaps, with the fact that it is so scattered. The different parts of the Empire, then, are sources of strength, but the long and naked trade routes are sources of weakness. The Empire cannot hold together by the defence of each part by fortifications, however strong; it must have free communications, and the only thing that will secure them is a strong navy to defend trade and destroy any ships that interfere with it. The navy, in turn, must have stations at which it can coal, oil, provision, and repair damage. If the enemy is without such bases he is naturally at

a great disadvantage; he must either replenish from confederate or captured ships or be caught in the long run, but, unlike Britain, he may not be absolutely dependent on sea command for his bare existence, and can still carry on the war even if swept off the sea. Absolutely complete command at sea is almost unknown, but command, if incomplete, may be sufficient.

In time of peace no Power has definite command at sea, because the sea is free to all, and in war command is "disputed" till one side has destroyed the naval forces of the other; but the nation that has an overwhelmingly strong navy may be said to have potential command, since no other Power will risk challenging it. The South African War showed that we had absolute command as against the South African Republics, which had no coast and therefore no navy, and we had potential command against some Continental Powers that would have liked to interfere, because we were too strong at sea for them to risk it. During the Great War our command was, after the first six months, effective in the outer seas, though some raiders got out, but disputed in the North Sea, Baltic, and the Mediterranean, because the High Seas Fleet and the Austrian Fleet did not come out to fight to a finish, and remained, with brief exceptions, within their defended areas as a constant menace which could not be disregarded. During the years 1917 and 1918 intensive submarine warfare, while it did not greatly affect our preponderance in strength in surface warships, gravely imperilled the freedom of merchant ships bringing our

vital supplies of food, and needed entirely fresh methods before it was defeated.

While command at sea is disputed there is always a possibility of raids—that is, sudden attacks—which may or may not be accompanied by a landing of troops. But though, as in the case of the Great War, it is hard enough to evade the naval forces of the stronger Power for a few hours and bombard his coast, it is far harder to bring over any considerable number of troops in bulky transports, and harder still to land them and take them off when the raid is over. Before the war it was considered possible that a raid with not more than 70,000 men might be attempted by enticing our Grand Fleet away in another direction, and it was for that reason that the whole of our Regular Army was not sent abroad at once, and of course such a raid, if successful, would have been a most serious thing for us; but the Navy proved a sufficient protection against even that. Such an enterprise, serious as it might be, would be very risky if undertaken before the British Grand Fleet had been defeated, since the raiding force would at once have its communications cut behind it and would have to support itself in a hostile country. Nevertheless, the country was never denuded of troops. With modern naval resources and the weight of artillery and tanks in a modern army it would be more difficult now than in 1914 to land an effective force.

Invasion implies forcing an entrance to an enemy's territory and the power to remain there with communications safeguarded. Obviously this cannot be done overseas without defeating the enemy's fleet and

Photo Cribb, Southsea.

H.M.S. NELSON. THE LATEST BATTLESHIP.

35,000 TONS. 45,000 HORSEPOWER. 23 KNOTS. NINE 16-INCH GUNS

facing p. 6.

overpowering the forces that oppose the landing. When this has been done it still remains to protect from attack by surface ships, aircraft, and submarines the constant stream of reinforcements and the supplies of all kinds that must be brought up to the invading army. All this cannot be done without complete, or nearly complete, command of the sea. In the Great War there was, till the last week or two, practically no land invasion of Germany; but if it had come earlier the British Army would still have been landed, not on the hostile coast, but by the friendly shore of France or Belgium. There was at one time a scheme from the fertile brain of Admiral Fisher for landing on Germany's Baltic coast as a diversion, but as this entailed going through the Skagerrack and Cattegat with a great fleet no surprise was possible, so the risks outweighed the chance of success. There was also a very fully prepared scheme, worked out by Admiral Bacon, for landing on the Belgian coast; but this depended on the co-operation of the British Army already in Flanders, and the army was held up at Passchendaele, so this also had to be abandoned. These two cases show both the difficulty of invasion overseas and the value of sea command, without which no plan could succeed. Napoleon, who never really understood sea problems, realized that his great invasion of England could not be carried out without complete command of the Channel for at least twenty-four hours, and, as Mahan put it in oft-quoted words: "Those storm-beaten ships, upon which the Grand Army never looked, stood between him and the dominion of the world."

CHAPTER II

A SHORT HISTORY OF THE NAVY—I

In this chapter an attempt is made to give, in a highly condensed form, some account of the Navy's share in defending the country from its enemies.

It was long the cheerful custom of the people of these islands, while glorying in the memory of such men as Nelson, to take British naval supremacy for granted—as a thing which needed little effort to maintain owing to the inferiority at sea of the benighted foreigner. Even the gigantic effort of the Navy during the Great War, and its share in shattering the resistance of millions who never set eyes on it, were and still are little realized.

A reading of naval history destroys the snug illusion of heaven-appointed mastery at sea, though it increases the reader's gratitude to the men who won it and kept it for so many years.

For a long time England was the prey in turn of Romans, Saxons, and Danes, who invaded the country again and again till the great King Alfred, who was the first ruler to grasp the truth that the best defence was to smash the enemy before he could land, and who not only organized the men but redesigned the ships on a better model than had existed before. On his death in 901 Edgar the Peaceful carried on his work, and maintained three fleets of 4,000 or 5,000 ships, regularly inspected and exer-

cised. It was this King who was rowed up the Dee by eight dependent Kings—a picturesque and unparalleled incident. Ethelred the Unready, by his neglect of any consistent policy and weakness of character, allowed this security to vanish, and paid amounts of £16,000, £24,000, and £36,000 in buying off the Danes, who naturally called again. In the intervals he made great preparations, but never got any further than that, so the Danes ravaged England unpunished.

At the time of the Norman Conquest there existed an English navy, to be sure, but it was scattered and disorganized, and did nothing to keep out William the Conqueror. William himself, though a victorious invader, was at first weak at sea, and was compelled to imitate Ethelred by paying the Northmen to go away; but having done so once, he energetically formed a fleet which the Danes, no bad judges, decided to leave alone. But for the loss of the *White Ship* in 1120, when the heir to the throne and many of the nobility of England and Normandy were drowned off the French coast, no important event at sea occurred during the reigns of William II., Henry I., Stephen, and Henry II.

Richard I., however, had larger schemes than coast defence, and immediately after ascending the throne he planned an overseas invasion—no less a project than the conquest of Palestine to recover the Holy Sepulchre. A very large fleet assembled at Dartmouth and sailed in eight lines, Richard eventually taking command at Messina. After a great struggle with a huge Turkish ship, which

carried 1,500 men and 200 deadly serpents to discourage boarders, he invaded Palestine. These "serpents" were not snakes, but some form of Greek fire. His land exploits do not concern us here. During the reign of John another invasion of England was projected by the French, but the Earl of Salisbury surprised and fell upon their fleet of 1,700 ships, and took or sank more than 400 of them. After the death of John a further attempt at invasion was made by Robert de Courtenay and Eustace the Monk, but the valour and skill of Hubert de Burgh, Governor of Dover Castle, defeated them, and at the Battle of Sandwich in 1217 only fifteen French ships out of eighty escaped.

At this period the defence of the coast was entrusted to the Cinque Ports, which, as their name shows, were at first five in number, but were later increased to seven under Henry III.—namely, Sandwich, Dover, Romney, Hythe, Rye, Winchelsea, and Hastings. These were required to furnish at any time 57 ships and 1,197 men, in return for which they enjoyed certain privileges. It was perhaps inevitable that the possession of such power would lead to abuse of it, and the Cinque Ports joined in the general game of piracy indulged in by the sailors of all nations. Outrage after outrage was perpetrated by English and Normans in turn till it was arranged, for all the world like a football match, to have it out off Saint Matré, each side with as many allies as it could get. This battle took place on April 14, 1293, Sir Robert Tiptoft being the English commander. It was neither a private fight nor an official one—any-

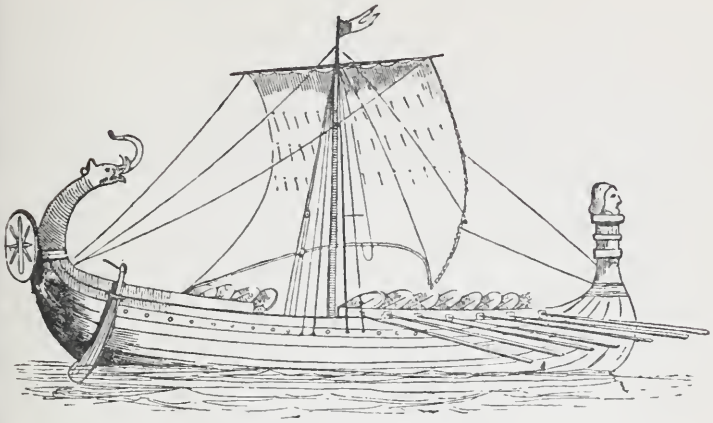
body could join in, and Flemish, Dutch, Irish, and Genoese did so with great gusto. After fearful carnage the 60 English ships utterly defeated more than 200 of the enemy fleet.

In the reign of Edward III., although no great invasion like those of the Romans, Saxons, Danes, and Normans took place, this country endured the humiliation of repeated local attacks by the French, Southampton, Plymouth, Sandwich, Rye, Winchelsea, and Hastings all being sacked, a state of things that one can hardly conceive of now! Edward III. was not the man to submit to it indefinitely, and at the Battle of Sluys in 1340 he led his fleet in person, and after a battle lasting all day and all night he utterly overwhelmed the French, so that no one could be found who would tell the French King Philip. The "command of the sea" having been won, King Edward invaded France, with results on land that will be found in any history book. In 1350 he again led the fleet, this time against "L'Espagnols-sur-Mer," a squadron of large Spanish ships which for some time had been harrying English ships in the Channel, and succeeded in defeating them well and truly. After this a period of neglect set in, as it so often did right up to our own times. The result was that Winchelsea and Portsmouth were both burned by the French, and in 1372 the English fleet was beaten by a much superior French force at La Rochelle, in which cannon were used as well as the old-fashioned methods of hand-to-hand combat with swords, arrows, and stones. Under Richard II. worse was to follow, and Rye, Winchelsea, Yarmouth,

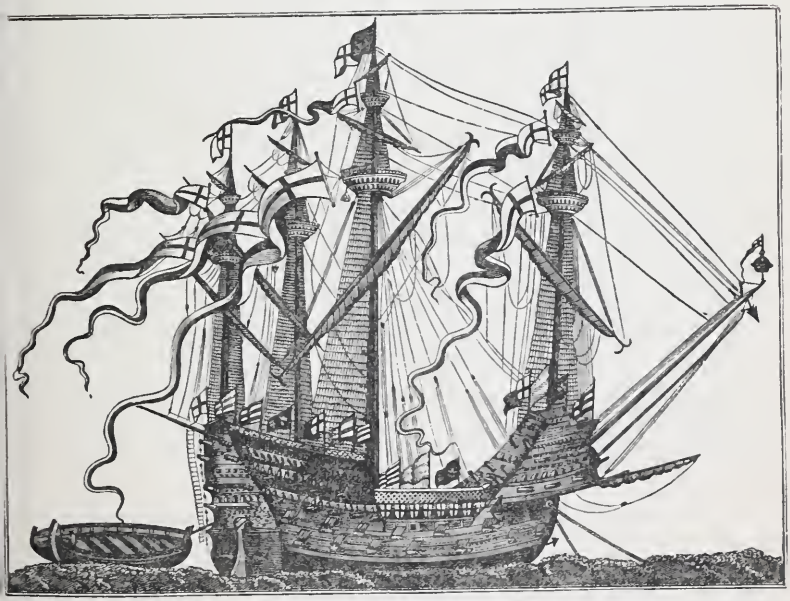
Dartmouth, Plymouth, Scarborough, and Gravesend were all sacked, some of them more than once; but the Earl of Arundel did something to restore the nation's honour by decisively beating a combined French, Flemish, and Spanish force in 1387, capturing 80 out of their fleet of 100.

For about thirty years after this there was an official peace; but private animosity was unchecked, and English and French took it in turns to capture each other's ships and harry each other's coasts. Henry IV., instead of maintaining a State navy, actually put coast defence under the merchants. Henry V., as might be expected, changed all that, and himself saw to the building of larger and better ships than England ever had before. Like Richard I., he was planning larger things than defence, and, like Edward III., was bent on the conquest of France. He carried out his invasion at Harfleur with 1,400 ships and 30,000 armed men in 1415. In the next year the Duke of Bedford defeated one French fleet at the same place, and in 1417 the Earl of Huntingdon beat another in the Channel.

Under Henry VI., the "Pius Fundator" of Eton and King's College, Cambridge, the naval glory of England collapsed once more, and the port of Sandwich was destroyed by the enemy; and during the Wars of the Roses Englishmen were too busy exterminating one another to think of fighting overseas, but Henry VII. did much to restore the efficiency of the fleet. The year 1485 saw the building of the famous *Great Harry* (also called *The Regent*), which differed from her forerunners in being built for war,



A Ship of the Northmen.



Henry-Grâce-à-Dieu.

though used for trade in peace, whereas previous ships had been built primarily for trade. It was in Henry VII.'s reign that Columbus and John Cabot made their great discoveries of different parts of America, and he may be called the founder of the Royal Navy.

Henry VIII., energetic, rich, and overbearing, soon after coming to the throne picked a quarrel with France, but did little at sea, and the failure of the French to invade England was due as much to luck as to English valour, the French fleet being dispersed by an outbreak of sickness.

Neither Edward VI. nor Mary added to English laurels, but with Elizabeth glory broke out once more with astonishing brilliance. Though the English navy had sunk to impotence, the amazing race of Elizabethan seamen, the Gentlemen Adventurers, Frobisher, Davis, Hawkins, and Drake, eclipsed by their deeds anything previously seen at sea. It was a war of Protestant England against Popish Spain, and was waged with the greatest ferocity on both sides. King Philip of Spain prepared patiently and methodically for the annihilation of the English heretics, while Drake, at first a private adventurer, carried out his heroic voyage round the world, pillaging the Spanish possessions in America and returning laden with riches. Spain looked on him as a common pirate, but Queen Elizabeth knighted him and made him an Admiral, which only put a keener edge on his ambition. In 1587, with twenty-eight ships, only four of which were of the regular navy, he defied the forts of Cadiz, destroyed 150

[*By kind permission of Messrs. Macmillan.*

Sir Francis Drake.

Spanish warships, took a vast amount of booty, repeated the manœuvre at Lisbon, and, genially describing his exploit as "singeing the King of Spain's beard," returned home.

King Philip was annoyed, as well he might be, but not thrown out of his stride, and he deliberately finished his preparations, which included a land force of 30,000 men waiting in the Netherlands to cross the North Sea in flat-bottomed boats for the invasion of England. These were commanded by the Duke of Parma, and they naturally could not cross till the "command of the sea" had been secured for their safe passage. For this purpose the "Invincible Armada," of 132 ships, and carrying more than 30,000 men, was organized. It was long said that the Spanish ships were veritable sea-castles and the English in comparison mere cockle-shells, a legend exploded by researches in later times; but though there was exaggeration in the first accounts, there seems to be no doubt that the Spanish fleet contained bigger ships than ours, and that for hand-to-hand fighting their great height gave them an advantage, but they were very cumbrous and slow, and the fast and handy English ships, accustomed to rougher weather, outmanœuvred them throughout. Moreover, the Spanish ships were largely manned by soldiers, whereas ours were manned and fought by trained seamen. The Spanish fleet was under the Duke of Medina Sidonia, a man almost wholly devoid of knowledge of his work. The English fleet was a scratch collection from the Navy of thirty-eight ships of all sizes from 1,000 tons downwards, but of

first-rate efficiency, with a swarm of others from every port carrying crews of matchless courage and all burning with hatred of Spain. It should be mentioned that the Spanish regarded guns as dishonourable weapons, and trusted to cold steel. Altogether the English numbered 197 ships, very many of extremely small size. The English Commander-in-Chief was Lord Howard of Effingham, with his Flag in the *Ark Royal*. It is only fair to mention that, though the Spanish had the finest ships, they had the worst of the luck. The Armada left the Tagus on May 30, 1588, and at once met bad weather, which buffeted them so severely that they had to put into Corunna to refit. On hearing about this, Queen Elizabeth, in a fit of meanness, ordered the English ships to be laid up, but Lord Howard had the wisdom and the courage to ignore the order. It was well that he did so, for after some weeks the Armada sailed again, and the news of it was brought to Drake while he was playing his historic game of bowls on Plymouth Hoe. The game finished, he and all his ships left harbour and on July 21 met the enemy.

The Spanish were not allowed to play their own game of boarding, which they infinitely preferred to gunnery, and they received a terrific hammering all the way up the Channel. The English ships repeatedly ran short of ammunition, but were able to replenish their supplies from the Spanish as disabled monsters fell out and were captured. One of these was the *Capitana,* which surrendered to Drake himself. There was a lull on July 24, during which fresh stores were received from England, and the

unlucky Spaniards, outsailed and raked from positions in which they could not reply, suffered a most terrible defeat. Howard then looked in at Dover once more for ammunition, and Medina Sidonia did the same at Calais Roads, hoping for some respite, but by July 28 Howard was at the enemy again, this time with fireships, which threw them into panic, during which the terrible Drake fell upon them and drove them north. The Invincible Armada fled, losing ships by wreck or capture every day. Wherever the crews landed they were killed, even in Roman Catholic Ireland, which might have been expected to be sympathetic. Eventually fifty-three ships, battered alike by shot and tempest, crawled into Corunna, with all their pride and fighting spirit gone.

The danger thus marvellously averted, Queen Elizabeth returned thanks at St. Paul's, accused Howard and the valiant Hawkins of misapplying public money, rewarded no one, and the starved and heroic crews were left unpaid for many days, though the blame for this cannot with certainty be given to the Queen.

Still Philip would not give up the game; but now the war was carried to his own country again by Drake and Norris, who attacked Vigo, Corunna, and Lisbon, while Fayal in the Azores was taken by Cumberland. In 1591 Sir Thomas Howard took a small squadron to the same islands in search of Spanish treasure ships, but instead met a large force of fifty-three warships and had to retire. It was then that one of his Captains, Sir Richard Grenville, in the little *Revenge,* refused to fly, and fought his immortal

fight of "the One and the Fifty-three," sinking four of them and only surrendering when powder, pikes, and masts were all gone and all his men dead or wounded. Grenville himself died of his wounds, and the *Revenge* foundered next day. Howard, Essex, Raleigh, and others continued to sink, burn, and destroy till the death of Philip in 1598 and Elizabeth in 1603.

Nothing notable happened at sea during the reigns of James I. and Charles I., but under Cromwell England had to encounter a far tougher and more skilful adversary than the Spanish. Her supremacy was challenged by the Dutch, a race of fine seamen led by brilliant Admirals. During 1652 and 1653 the two navies, commanded on our side by Blake and Monk, and on the Dutch by Tromp and De Ruyter, and manned by crews of equal daring and doggedness, struggled for mastery, with the fortune of war wavering to and fro. The slaughter was terrible, but eventually in July, 1653, Monk, savagely ordering "No quarter; no captures," fell upon the gallant Tromp, burning twenty-six of his ships, killing 5,000 of his men, and Tromp himself with them. Peace was made in 1654.

In 1656 Cromwell made war on Spain and destroyed the troublesome pirate fleets of Tunis, Tripoli, and Algiers, and in the next year Blake destroyed the Spanish forts and treasure ships at Teneriffe; but the great Admiral was failing fast in health, and died just as he entered Plymouth Sound. Cromwell died soon after, and the Dutch, seeing that he and his great sea captain were removed from their path, soon picked a

fresh quarrel. At the Battle of Lowestoft in 1665, the Duke of York, later James II., Prince Rupert, and the Earl of Sandwich with 114 ships met 103 Dutch ships under Admirals Opdam, Cornelius van Tromp, and Evertzen, destroyed 30 Dutch ships, and scattered the rest, Opdam himself perishing by the blowing up of his own ship. In 1666 Monk with 60 ships met and attacked De Ruyter with 91. The odds, against such seamen as the Dutch, were far too heavy, and Monk, though fighting hard for four days, was beaten, Prince Rupert with 30 ships arriving too late to turn the scale. The courage of Monk's men was warmly praised by their chivalrous conquerors. On July 25 in the same year 80 English ships, again under Monk and Prince Rupert, met 88 Dutch and sank or captured 20 of them, which enabled the English to attack and destroy no fewer than 160 Dutch merchant ships in their own waters. This should have been the end, as the Dutch had had enough of it; but hearing that the English ships were laid up they boldly set out again, and actually burnt some of our warships in the Thames itself. Another fleet under Sir E. Spragge then arrived and chased them off, after which, in 1667, peace was made once more, and an alliance was concluded with our late enemies and Sweden against the French. During this war naval tactics were revised, a more orderly line of battle taking the place of single ship encounters.

Now followed an episode of which we cannot be proud. The unscrupulous Charles II. ignored the new alliance, and secretly persuaded the French to join us in an attack on the Dutch. The outcome

was a terrific battle in 1672 in Sole Bay, near Southwold, between 65 English ships under the Duke of York and Lord Sandwich and 90 Dutch with 40 fireships under De Ruyter. The French ships, to the number of 36, which were supposed to help, held off and took no part in the battle. Eventually both sides claimed a victory. This was followed by three more battles, all fiercely fought, all drawn, and all without the assistance of the French ships, which, with one splendid exception, turned themselves into spectators. After these actions both sides wanted peace and signed it in 1674; but the English were recognized as supreme, and thereafter even Dutch fleets lowered their flags to single English ships.

In the reign of William and Mary foreign relations underwent a marked change. The French became our enemies and the valiant Dutch our friends. The French landed men in Ireland in 1689, selecting that country as likely to prove hospitable; but Admiral Herbert attacked and dispersed them, for which he was made Earl of Torrington. Next year, being under orders to fight at all costs, he commanded a combined fleet of 56 English and Dutch ships, and was defeated by de Tourville with 84 ships. In 1692 the position was reversed, de Tourville with 63 ships being forced to engage Admiral Russel, the successor of Torrington, with 99 English and Dutch at La Hogue. With Russel were Sir Cloudesley Shovel and Sir George Rooke. The French fought well, but it was a hopeless business against such odds, and only thick weather saved them from annihilation. As it was, sixteen French ships were sunk, and the invasion of

England that was to accompany the French operation was abandoned.

The English fleet now had to tackle the mob of French privateers which was crippling our trade, and they did it by destroying St. Malo and Dieppe and bombarding Havre and Calais, where the privateers were anchored.

The Peace of Ryswick in 1697 did not last long, as France claimed the Spanish dominions on the death of King Charles, so an alliance was made between England, Austria, and Holland, and war was declared. Cadiz had been made extremely strong since Drake paid his call, but at Vigo Sir George Rooke, in spite of the awkward entrance, with its boom and powerful batteries on both sides, forced his way in, took or sank fifteen French battleships, two frigates and fifteen Spanish galleons, and £2,000,000 in money.

In the West Indies there was an ever regrettable incident. Admiral Benbow, a splendid seaman but a stern martinet, just but overbearing, was in command of seven ships, and fell in with the French Admiral Du Casse in about equal force. To their eternal disgrace all but one of the English Captains lagged deliberately behind, leaving Benbow's flagship *Breda* and the *Ruby,* whose Captain had at first been one of the conspirators, to attack alone, in doing which they were badly hammered. Another Captain then repented and brought the *Falmouth* to help, but the rest held aloof. Benbow was mortally wounded, but had himself hoisted on deck to direct the action. The French got away, and the shattered Benbow repaired to Jamaica, court-martialling his despicable

officers on arrival. Later on two were shot as they deserved, one died, one was imprisoned, and two others suspended, but forgiven for their subsequent good conduct in the action.

In 1704 Sir George Rooke and Sir Cloudesley Shovel attacked and took the famous fortress of Gibraltar, whose garrison had been depleted owing to too great confidence in the natural strength of the Rock. It was a great piece of good fortune, as a small force might have held out for a very long time, but there were at this time hardly enough men to mount the usual guards. From Gibraltar Rooke turned towards Toulon, and with 53 ships overhauled the French under the Comte de Toulouse with 50 ships of the line and 24 galleys. The fight lasted all day, and at nightfall the French retired and could not be brought to action again. The results of this battle are uncertain, since both sides claimed a victory; but the French retreated and lost five ships, while Rooke lost none and remained on the field, and it may be added that for some time no other French fleet put to sea. The Spanish made two strong and nearly successful attempts to retake Gibraltar, the loss of which was a sore matter to them. In the West Indies, the Mediterranean, and the Channel, though no French fleet came out, the war was carried on against our shipping, Comte de Forbin and Duguai Trouin showing the greatest skill and daring in their operations with the intention of stopping our overseas trade. In 1713 peace was made at Utrecht, by the terms of which England kept Nova Scotia, Newfoundland, Gibraltar, and Minorca.

Under George I. we again became embroiled with Spain, that proud nation naturally chafing at the loss of its possessions. The Spanish seized Sardinia and then proceeded to attack Sicily, so Admiral Byng was sent to intervene, though without actually declaring war. His warnings being unheeded, Byng with twenty-one battleships attacked the twenty-nine Spanish ships at Cape Passaro in 1718, and took or burned sixteen of them, four more being accounted for not long after. Unofficial strife between the two countries continued till after George II. came to the throne, but in 1727 a formal treaty of peace was signed. In spite of this, however, ill-feeling and private encounters continued till the dramatic appearance of Captain Jenkins at the House of Commons in 1738, with a bandaged head and a box which was said to contain his ear, cut off by a Spanish officer, with a threat to do the same to King George. The House was highly indignant, and popular opinion ran so high that war was declared in 1739, the Government being spurred thereto by Captain Vernon, an overbearing and bellicose member of Parliament. Vernon was made an Admiral and sent out in command of a fleet. He captured Porto Bello, which was quite unaware that war existed and was only half armed, at small loss, but after that he failed completely before Cartagena by sheer incompetence. A similar affair took place at Santiago, after which Vernon returned to England and his name was removed from the Navy List.

As a set-off to this came the wonderful voyage of Anson and the *Centurion,* both man and ship being to this day held in high honour by the Navy. Com-

modore George Anson was sent in command of six ships, of which *Centurion,* of 60 guns, was the largest, to make war on Spain in the Pacific. Never did a commander do more with worse material and against greater ill-luck. His ships were not in good condition, his crews were largely invalids, and terrific weather and persistent sickness dogged him from the first. He started in September, 1740, round the Horn, but it was not till next June that he arrived, and alone, at Juan Fernandez. The little *Trial,* of 8 guns, arrived next day, and the *Gloucester,* of 50 guns, soon after. The *Gloucester* only had eight men fit for duty owing to scurvy, and the *Trial* had to be destroyed as unseaworthy. Anson did not waver, but proceeded with only one-third of his ships and men to take prizes and harry the coast of Peru. The *Gloucester* was the next to go, having become quite unfit for sea, and Anson carried on alone with the *Centurion,* though she was in an almost hopeless condition. He succeeded in getting to the Ladrones Islands, where he landed all his sick, including himself, to recuperate. Hardly had he done so than a sudden gale sprang up and his only ship was driven out to sea! After days of anxiety she got back, and Anson, who might have honourably returned home, went off again after the huge *Nuestra Senorade Cobadonga,* crammed with treasure, which was bound for Manila. Anson first went to Macao in China, in order to refit as far as possible, after which he set out again, and on June 20, 1743, he fell in with his prey. He had only 201 men left against her 550, and 60 guns against her 70, but the ferocity and rapidity of

his attack quickly forced her to surrender. He took out of her more than £1,250,000, and then sold her in Canton. Having done his duty after three years of incredible misfortunes and misery, he turned for home, and, miraculously running through the French fleet in the Channel in a fog, he anchored at Spithead, receiving due honour for his brilliant example of skill, bravery, and sustained devotion to his duty.

In the Mediterranean the war was carried on by a fleet of twenty-eight battleships watching the French and Spanish fleet at Toulon. Admiral Mathews was in command, and with him was Admiral Lestock, and when the enemy sailed in February, 1744, Mathews at once made the signal to engage; but Lestock took no notice, and remained miles away during the action. The result was that instead of winning an important victory our ships were badly hammered. At home this monstrous proceeding was treated as a political matter, and Mathews, who had done his best, but was a member of Parliament on the Opposition side, was disgraced, while the unworthy Lestock was honourably acquitted, but did the same thing two years later! In 1747 the French despatched two squadrons from Brest to operate on the North American and Indian coasts; but Anson and Warren got wind of it, and captured them all off Finisterre. In the same year Hawke engaged Admiral de l'Etendeur, who with nine battleships and a few frigates was convoying 250 merchantmen; Hawke had fourteen ships of inferior size and gun-power, but de l'Etendeur lost seven ships out of nine,

and was glad to make his escape with his convoy and his two remaining ships of war when darkness fell, leaving the English ships too badly battered to pursue. In 1748, after some other less important work in the East and West Indies, peace was declared, which lasted till 1756, when troubles in America caused a fresh declaration against France and Spain. Our enemies were determined to expel us from the Mediterranean, where they thought we had no business, and Admiral Byng, with a fleet badly equipped and manned, was sent to Gibraltar. Byng acted with less than his former energy, and failed to pursue the French Admiral when he retreated before the determined attack of Admiral West. As a result the besieged Minorca was not relieved, and fell to the French. Both Admirals were court-martialled on their return. West was, of course, exonerated, but Byng, though acquitted of cowardice and recommended to mercy both by the court-martial and his own council of war, and only found guilty of an error of judgment, was the victim of popular outcry, and, in spite of the appeals of Admiral West, was shot on his own ship, "pour encourager les autres," as the witty Frenchman put it.

For a year or two there was no fleet action, but in 1758 Hawke attacked Rochefort and Aix, driving the French fleet ashore; Howe destroyed Cherbourg; and in the East and West Indies Watson and Pocock, Forrest and Suckling, kept the English flag supreme by strenuous fighting.

In 1759 another invasion of England was projected by the French, a large army being collected at Havre

for the purpose, and three fleets were fitted out to combine and cover the operation. These consisted of twelve battleships at Toulon under de la Clue, twenty-one under Conflans at Brest, and a number of frigates at Dunkirk under Thurot, and they were respectively faced by Boscawen with fourteen ships, Hawke with twenty-three, and Commodore Boys with a squadron of frigates. For some time the French could not be enticed out of harbour, but in the meanwhile Admiral Rodney entered Havre, set fire to it, and destroyed the transports and stores. Boscawen tried to force de la Clue out of Toulon, but found the combined forts and ships too strong for him, and retired with considerable damage to Gibraltar, possession of which proved very important. De la Clue thereupon came out, meaning to join Conflans; but Boscawen was looking out, brought him to action off Lagos, and de la Clue lost five of his seven ships. Hawke was driven from Brest by a heavy gale, and Conflans took his chance and escaped, but was caught again at Quiberon, where he did not think Hawke would follow. To the horror of his pilots, however, Hawke went after him through the dangerous reefs and shoals. Two of his ships ran aground and were lost, but all the French which were not sunk fled up the river and were beached. It was a characteristically daring piece of work by the English Admiral. Thurot, like Conflans, took advantage of the weather to leave Dunkirk, but Boys went after him and drove him into the Baltic. Thurot stayed there till the next year, 1760, when he contrived to get out, landed a force in Ireland, and actually took Carrickfergus;

but in an action with Captain Elliot's frigates he was killed and his whole squadron captured.

In 1761, King George III. having come to the throne, it was decided to attack the island of Belle-isle, but it was only successful at the second attempt. In India Pondicherry was captured, as were Domenica and Guadaloupe, while Canada also became a British possession. It seemed as if peace would follow, but Spain again joined France, and preparations were made at once to attack her in the West Indies. Before the main expedition, that to Havana, was ready, Rodney at sea and General Monckton ashore by brilliant combined operations took Martinique, while nearer home the richly laden Spanish galleon *Hermione,* quite unaware that war existed, was captured very tamely off Cadiz in May, 1762, and this affords a picturesque example of the use of suddenly acquired riches by people not accustomed to them. Her cargo was so valuable that every officer and man, in different proportions, became rich at a stroke, even the bluejackets receiving £500 each as their share. The simple-minded Tars bought all the watches in Portsmouth and fried them over the galley fire, thereby impairing their future usefulness; and as uniform regulations were slack in those days they prescribed for themselves gold-laced hats—decidedly a novelty on the lower deck. Eventually, of course, the only people who benefited were the shore sharks. The officers no doubt were more sensible.

The great Havana expedition sailed under Admiral Pocock in March, 1762, with twelve battleships and

14,000 soldiers, which had to encounter the strong shore defences manned by 20,000 men and an equal naval force. Instead of coming out to meet us, the Spanish sank three ships at the harbour entrance, so that the main operation was military; but after a great struggle against not only the enemy but the climate also, our force captured the place and its superb harbour. In the East Admiral Cornish took Manila, again after a hard struggle, and at the same time captured an enormous and strongly protected galleon named *Santissima Trinidad,* carrying a large cargo worth 3,000,000 dollars. Next year both our enemies had had enough and made peace, and Minorca (exchanged for Belleisle) and Nova Scotia became part of the British Empire.

Twelve years of peace followed, during which much was done in the way of exploration, Byron, Wallis, Carteret, and the famous Captain Cook in the Pacific, and an Arctic expedition in which young Horatio Nelson served, all doing brilliant work.

Trouble now arose among our own people in North America, who strongly objected to any taxes levied upon them by England. We made the mistake, not for the last time, of underrating the strength of their feeling and their power of resistance, and in spite of some naval successes the affair went against us. The Declaration of Independence was signed and proclaimed on July 4, 1776, and the great United States of America came into being. It did not terminate our naval effort, as Lord Howe was sent out to Sandy Hook with a squadron, and had the interesting experience of being attacked by David

Bushnell in the first submarine, in which he tried to attach a large bomb to the bottom of the flagship *Eagle,* but without success. Captain Douglas built on the spot a squadron with which he destroyed the rebel fleet on Lake Champlain, but after that there was little for the Navy to do till in 1778 the French sent out Admiral d'Estaing to help the Americans. D'Estaing did a good deal of threatening but not much else. At home there was a badly managed affair off Brest between Admiral Keppel with thirty battleships and d'Orvilliers with thirty-two, in which Keppel was ill-served by one of his Admirals, Sir Hugh Palliser, who started well enough, but later on failed to repeat Keppel's signals till it was too late to crush the French, who escaped in the darkness. A long dispute followed, Palliser accusing his chief for the failure. Again it was made a political matter, in the unwholesome fashion of the time, the two officers being members of Parliament on opposite sides, and both were court-martialled and both acquitted.

In 1779, Spain again prepared to fight us for the possession of Gibraltar, while in the West Indies Byron did his best to grapple the shy and elusive d'Estaing, who once more made his escape. Gibraltar was attacked by land and sea, and yet another big scheme for invading England with 50,000 men was made by the combined French and Spanish, whose huge fleet of sixty-six battleships actually appeared off Plymouth. We could muster no more than forty-six battleships under Admiral Hardy, but, luckily for us, the French and Spanish commanders

fell out with each other and sailed back again. For the relief of hard-pressed Gibraltar Admiral Rodney was despatched with twenty-one battleships. Capturing a Spanish convoy on the way, he sighted the Spanish squadron of nine battleships and two frigates, and, as might be expected, took or destroyed all but two of them. Rodney relieved both Gibraltar and Minorca, and then proceeded to the West Indies to help Sir Hyde Parker, who was blockaded by Comte de Guichen and twenty-five battleships. Rodney attacked at once, but the French took refuge in Fort Royal, Martinique, and could not be tempted outside till Rodney retired to St. Lucia. Again Rodney attacked, and there was every prospect of a resounding victory, but a piece of incompetence in his own fleet ruined his plans and scattered his ships. With his flagship and eight others he strove to retrieve the situation, and by heroic fighting was able to put de Guichen to flight, but the chance of complete victory had vanished. It was doubly unfortunate, because a Spanish fleet now arrived and joined the French, so Rodney with seventeen battleships and two of smaller size had to face a combined fleet of thirty-six ships of the line; but he disposed his force at St. Lucia so well that the enemy took no risks. Luckily again for us, the enemy commanders quarrelled and separated, the French to join d'Estaing at Cadiz and the Spanish to Havana.

Our enemies were numerous enough, but in 1781 the Dutch were added to the Americans, French, and Spanish, and, though their naval strength was far less

than in the days of Blake and Tromp, they were, by reason of their seamanlike qualities, a great additional anxiety. Gibraltar, relieved by Rodney, was now again hard pressed. The lack of fresh vegetables and fruit had produced scurvy, and provisions of all kinds rose to famine prices, biscuit crumbs being a shilling a pound, and butter being little better than rancid congealed oil. But while the troops were on short allowance the civil population was in an even worse case, as there was no regular provision for them at all. In April, however, Admiral Darby arrived with his fleet, a sight which Captain Drinkwater, the historian of the siege, describes as "one of the most beautiful and pleasing it is possible to conceive." After all the sufferings of the garrison it must have been welcome indeed.

In August of the same year, 1781, a fierce battle, quite in the old style, was fought by Sir Hyde Parker against the Dutch off the Dogger Bank in the North Sea. The Dutch ships were in better condition, and the damage on both sides was great; but the Dutch made off, leaving the English in possession of the field, but unable to pursue. Meanwhile Rodney took some Dutch islands in the West Indies, and, with Hood and Graves, endeavoured to tackle de Grasse, the French Admiral, who was in superior force. Rodney himself broke down in health and came home, and de Grasse, strongly reinforced, retook from us many of our hard-won possessions, Hood being too inferior in strength to attack him. It was a time of great anxiety, things having gone badly ashore against the Americans; but after a while Rodney partly

recovered and sailed to the help of Hood. Eventually he, with thirty-six ships, met de Grasse with thirty-four in 1782, and this time there was no mistake in the tactics of his subordinates, and in a terrific battle of twelve hours he defeated the French Admiral off Martinique, but was unfortunate enough to lose all but two of his captures in a hurricane in the Atlantic. The battle was just in time, as public opinion had turned against Rodney, and orders for his supersession had already been given when news of the victory was received.

Again Gibraltar was in difficulties and had to be relieved once more, this time by Lord Howe, whose fleet arrived after the garrison had repulsed a determined attack by sea and land, the enemy's ships fleeing as soon as Howe's fleet was sighted. In the East Indies Admiral Hughes fought five fierce but indecisive actions with the stronger fleet of the French Admiral Suffren, and was about to fight a sixth when the Treaty of Versailles in 1783 relieved both and restored to us most of our belongings, after fighting three European nations and our own kin in America.

By this time young Horatio Nelson, England's most brilliant seaman, had already given proof of his great qualities. Though only twenty-two years of age, he was already a Captain, and commanded a 28-gun ship named *Hinchinbrook,* in which, in 1780, he conducted a small naval and military expedition against Fort San Juan at Lake Nicaragua. It was a small but notable success, but it nearly wrecked Nelson's health, and he returned to England to recuperate.

The short breathing-space of ten years that now followed was again used for useful exploration, in the course of which Captain Vancouver added the island named after him to the Empire, though its possession was later disputed by Spain, which claimed the island as Spanish by gift from the Pope. There occurred also the mutiny of the *Bounty* in 1789, which was engaged in endeavouring to take bread-fruit trees for planting in the West Indies. The *Bounty's* commander, Captain Bligh, was a stern martinet, and his crew rose against him and turned him adrift with sixteen of his people in a small boat. After great hardships they eventually reached the island of Timor, while the mutineers took possession of Pitcairn Island, where their descendants are still to be found.

CHAPTER III

A SHORT HISTORY OF THE NAVY—II

In 1793 we again had to fight France, whose people, maddened by oppression, flared up into rebellion and looked on all who did not share their ideas of Liberty, Equality, and Fraternity as enemies. A quarrel was soon picked, and at first we found ourselves with Holland and Spain for allies. Our commanders were Lord Howe in the Channel and Lord Hood in the Mediterranean. The latter took advantage of the presence of many loyalists in Toulon to capture that port, nominally helped, but actually hindered, by the Spanish. Unfortunately, there were too few troops to defend the place against the 60,000 revolutionists who poured down from the north, so after destroying the military works and ammunition and taking with them some 15,000 civilians, Hood's fleet left the place. Hood then turned to Corsica, where the port of San Fiorenzo was taken by British troops. Bastia and Calvi were much harder to tackle, and it was only the representations of Nelson, who commanded the *Agamemnon* (64) that succeeded in reversing the decision of the General on the spot not to attack. Nelson did wonders without him, and took Bastia in May and Calvi in August, 1794, but at the latter place he lost his eye by a ricochet. Corsica, the native place of Napoleon, thus passed into our hands for a time.

Meanwhile Howe, who had had no success for a

year, had the triple duty of protecting a British convoy, capturing a French one, and fighting the French Admiral Villaret-Joyeuse, who was based on Brest. On May 28, 1794, he found the French fleet of twenty-six battleships, himself having the same number. The French retired, and were at once pursued. Catching them on May 29, there was only time for a partial engagement, and on the 30th fog prevented further action; but on the 31st it cleared, and the French, who had already lost several ships, were found to have been reinforced to their original strength. All day Howe manœuvred for position, and on June 1, the "Glorious First of June," the battle began in earnest. After terrific single-ship actions the French lost seven and the rest retired, badly battered but unpursued. Both sides claimed victory, but though the honours undoubtedly remained with Howe, it is hard to see why he did not follow up his success. In the West Indies we took Martinique, St. Lucia, and Guadaloupe, but lost the last named again later on.

In 1795 the Dutch changed sides and joined our enemies, and next year the Spanish did the same, so again we found ourselves pitted against three nations. In June, 1795, Villaret-Joyeuse with twelve battleships encountered Cornwallis with five, and nearly scored a notable success; but Cornwallis pretended to sight another British fleet, so the French broke off the engagement. Three days later they fell in with the real Channel fleet of fourteen battleships under Lord Bridport, who chased them for four days, but after three French ships had surrendered the rest were allowed to escape.

Bridport, now a man of seventy, had returned to England on account of his health, leaving the Mediterranean command to Admiral Hotham with fifteen battleships. Hotham had done good work as a younger man, but, as others have done before and since, seemed to lose his nerve and dash when in supreme command. He sighted the Toulon fleet and chased it, but after Nelson in the *Agamemnon* had taken, almost singlehanded, the *Ça Ira* (80) and *Censeur* (74) the battle was broken off, to the voluble indignation of Nelson, who counted nothing well done that was not completely done. A little later the same Toulon fleet was led by Nelson up to Hotham, who, though he was in greatly superior force, again allowed the fight to be broken off after taking only one French battleship. It was not a satisfactory frame of mind for a British Admiral, and commended itself not at all to Nelson.

The French tried invasion again, this time with a force of thirty ships and 18,000 men, but the fleet was scattered by a heavy gale and nothing came of it. We managed to take the Cape of Good Hope from the Dutch, but things went none too well for us in the Mediterranean, where Hotham's successor, the grim Sir John Jervis, had not a strong enough force to hold Elba and Corsica against the combined French and Spanish, so he withdrew to Gibraltar.

The year 1797 was a memorable one for a great sea victory and a disgraceful naval mutiny. First Jervis, with fifteen battleships, met the Spanish with twenty-seven, many of which were more powerful than any

of ours, off Cape St. Vincent. As each Spanish ship was sighted Jervis replied: "Very well, sir;" but when the number grew to over twenty he cut the matter short—"Enough of that, sir; if there are fifty sail I will go through them." It was a bold attitude, the Spanish numbering over a thousand guns more than the British, but this was balanced by the great superiority of the British crews. Jervis's plan was to sail between the two portions of the enemy fleet and smash the larger before the smaller could join in, but an unexpected Spanish movement round the rear of the British line looked likely to frustrate this design. Nelson, commanding the *Captain,* last but two of the line, saw the danger, and without hesitation turned his ship out of the line without orders and flung himself across the enemy's path, followed soon by the *Culloden* and *Excellent.* Under fire from at least five Spanish ships, the *Captain* was badly battered, but with amazing heroism he boarded first the *San Nicolas* of 80 guns, and then the *San Josef* of 112, took them both, and received their officers' swords on the latter's quarter-deck, one of his crew tucking them under his arm like so many sticks. Two other Spanish ships struck, and the vast *Santissima Trinidad,* of 130 guns, was rendered helpless. It was a much-needed victory, and Jervis was made Lord St. Vincent, while Nelson received the Knighthood of the Bath.

Now followed in a few months the great mutiny. For long the treatment of the seamen of the fleet had been very bad, and there was much provocation. Pay and food were miserably poor, and in too many cases

discipline was brutal. The words of the song were recalled:

"Ere Hawke did bang
Mounseer Conflans
You gave us beef and beer.
Now Mounseer's beat
We've nought to eat
Since you have nought to fear."

Respectful representations were found useless, and in the end the men refused to leave harbour till their wrongs were redressed. It was soon clear that their case was just, and reforms were promised; but there were delays, and more trouble followed, bred by suspicion. Eventually all demands were granted, and Portsmouth and Plymouth fleets resumed duty; but the Nore fleet was less reasonable, and was stirred up by one Parker to present impossible terms. Admiral Duncan, who was watching the Dutch, found himself with only two ships left, and he could only fool the Dutch by signalling to an imaginary fleet as Cornwallis had done. Parker's mutiny, in face of the return to duty of the Portsmouth and Plymouth ships, failed, and he himself was hanged. The infection spread to the Cadiz and Cape fleets, but it was sternly suppressed, there being no longer any real grievance. Nelson himself never maintained discipline by harshness, but he was merciless to insubordination, and vigorously assisted Jervis to quell it.

It was now impossible to get the Spanish to fight again, so Jervis planned an attack on Santa Cruz in the Canaries, placing Nelson in command. Though it was carefully planned it failed. Nelson lost his

arm and had to return to his ship, while his second-in-command, the gallant Troubridge, found his 340 men with soaked ammunition opposed by the whole Spanish force of 8,000. He was lucky in being allowed to re-embark. Nelson lost, besides his arm, much prestige and all his spirits, and made up his mind to retire.

In October of this year, 1797, there occurred the Battle of Camperdown, in which Duncan, with sixteen ships, fought the Dutch under Admiral Winter with fifteen. It was a typical English-Dutch battle, skilful, seamanly, and dogged. In the end nine Dutch battleships and two frigates surrendered, but our own were badly knocked about and only got back with difficulty. After the failure at Santa Cruz it came as a great relief to the nation.

In 1798 the French yet again planned a great invasion of Britain, Ireland being chosen by General Bonaparte as the most likely ground. The first small expedition landed safely in Killala Bay, but the raiders quickly surrendered. The second was detected by British frigates, suffered much from a heavy gale, and was eventually defeated by Admiral Warren.

Having hammered the Dutch and Spanish we were now able to reappear in the Mediterranean.

We could not afford to ignore the inland sea for long with the restless and ambitious Bonaparte free to prepare trouble for the rest of the world, so in April, 1798, St. Vincent ordered Nelson to proceed with a small squadron to Toulon. He discovered that Bonaparte was about to sail for an unknown destination with an army of 36,000. Nelson at once

sent news to St. Vincent, who despatched powerful reinforcements, making Nelson's force up to thirteen 74's and one 50-gun ship. The French sailed, managed to elude Nelson, and got clear away. Nelson concluded that their objective was Egypt, and sped off to Alexandria. He was two days too soon and found the harbour empty, so he returned, but still convinced that he was right. Before the end of July he heard to his relief that the French had been seen off Crete making for Egypt, so back he went again. This time he found them—thirteen battleships under Admiral Brueys, with his flag in the huge *L'Orient* of 120 guns. He had anchored his fleet right across Aboukir Bay in the form of a partly drawn bow-string, with the flagship in the centre, and he had such confidence in the strength of his position that he was only cleared for action on the seaward side of his ships. Nelson's quick brain grasped at once that if there was room for ships to swing there was room for his own to pass, so, though the evening was well advanced, he attacked the centre and western half at once, passing through the line and engaging the unprepared side. The brave Troubridge in *Culloden* ran ashore, but the rest passed on in the gathering dusk and forced ship after ship to surrender. Nelson was badly wounded in the head, but refused to be attended to out of his turn, though blinded for a time and in acute pain. Eventually his wound was found not to be mortal, and he went on deck to watch the burning *L'Orient,* which at ten o'clock blew up with great loss of life. By morning, out of thirteen ships nine

were taken and two destroyed, together with a shore battery. It was a resounding victory, and, besides the purely naval results, it left the French army stranded and cut off in Egypt. India was saved, and English prestige in Europe rose high. Honours were showered on Nelson, who continued to harry the enemy at Leghorn and Malta, while Minorca was retaken without loss by an independent squadron. Outside the Straits the French had other forces, and in April, 1799, Admiral Bruix left Brest with a splendid fleet which grew to forty battleships and nineteen frigates, sailed into the Mediterranean—and then sailed back without doing anything at all.

Bonaparte, on shore in Syria, took Jaffa and tried to take Acre, but was repulsed by the Turks under the British Commodore, Sir W. Sidney Smith, after a long siege, whereupon Bonaparte abandoned his army and escaped to France by frigate.

In August of the same year Duncan, with the aid of a Russian land force, took a Dutch fort at the entrance to the Texel and sailed in with his fleet, on which the Dutch lost heart, an unusual occurrence with those splendid fighters, and surrendered all their ships without a struggle.

On September 5, 1800, Malta was taken by us after a long and gallant defence. In the same year our insistence on the right to search foreign ships for enemy goods got us into trouble with Russia, Prussia, Denmark, and Sweden, and particularly Denmark, which resisted by force. A fleet of twenty battleships was therefore sent into the Baltic under Sir Hyde Parker, an officer who could never make

up his mind, with Nelson as second-in-command. The problem before Parker was like that of Nelson at the Nile, but far more difficult. The Danish fleet, a mixed but powerful force, was anchored in close order before Copenhagen, supported by shore batteries, and with navigation made exceedingly perilous by the removal of all buoys and marks. To seaward was a big shoal called the Middle Ground, round which an attacking force had to sail. There was no chance here of attacking from both sides owing to there being no room between ships, and also owing to the shore batteries in the rear, so that a much more confident sailor than Parker might have thought twice about it, but Nelson at once offered to do the work with ten battleships. Parker gave him twelve, with frigates in addition. While waiting for a favourable wind much patient work was done by Nelson in taking soundings at night. On April 2 the desired wind sprang up, and the fleet rounded the shoal in succession. All got safely round except *Bellona, Russell,* and *Agamemnon,* which ran aground. Parker could only see the three stranded ships and hear the continuous roar of the guns, so that he was in great and natural anxiety about his brave but impetuous second. Probably intending to cover Nelson while accepting responsibility himself, he signalled the recall; but Nelson, who was in his element, put his blind eye to the telescope and declared that he could not see the signal. Things, however, were not going too well, and the difficulties were increased by the fact that when Danish ships struck fresh crews were sent from

the shore behind, and these fired on the British boats which were sent to take possession. This naturally enraged Nelson, who sent a formal threat to the Danish Crown Prince that he would be obliged to burn the ships without rescuing their crews, but he promised to spare Denmark if she ceased to resist. About the same time the Danish flagship *Dannebrog* burst into flames and blew up. A conference took place with Sir Hyde Parker, and the Danes agreed to give up the prizes and conclude an armistice. It was fortunate, as our own ships were badly mauled, and would soon have found it hard either to go on fighting or to get away.

Parker then went after the Swedes, but they took shelter behind their defences, and very soon Parker was recalled and Nelson took his place. "The Northern Confederacy," as it was called, quickly broke up, and Nelson, seriously broken in health, returned to England and was made a Viscount.

August, 1801, saw him at sea again, commanding a fleet in the North Sea and the Channel to protect Britain from the invasion which Bonaparte was planning on a huge scale and with minute care. Nelson attacked the great Boulogne flotilla, which was to be the means of landing the French army on our shores, but without success, as his big ships could not get close enough, so that it became an affair of boats. In the Mediterranean Watson, Keith, and Saumarez grappled successfully with Ganteaume and Linois till in October hostilities ceased, and in March, 1802, the Peace of Amiens was proclaimed.

It was not to last long. The unscrupulous Bona-

parte managed to pick another quarrel in 1803, and invasion was again the centre of his plan, for though he never grasped the meaning of sea power, he saw clearly that until he could defeat us somehow he could never attain his dreams of world dominion, and he had little hope of beating us at sea. As in the Great War more than a century later, the British fleet kept the sea, and her enemy for the most part stayed in harbour waiting for a favourable chance. Off every French port British ships kept watch to give word to Cornwallis in the Channel or to Nelson, awaiting Latouche-Treville off Toulon, in the Mediterranean. Nelson, like Jellicoe, did all he could to entice his enemy out, but with no success, and month after month, battered by gales and sadly in need of refit, his ships kept watch.

In the Channel every port near Boulogne was humming with preparations for the great invasion of England by an army of 150,000 men in flat-bottomed boats. Bonaparte's programme demanded command of the Channel for six hours—only six hours, at his own chosen time! But though Holland and Spain again joined forces against us, that six-hours' mastery was never gained. The steel grip of the British Navy, by which Cornwallis bottled up Ganteaume at Brest, Orde watched Cadiz, Cochrane and Calder guarded Ferrol, and Keith accounted for the Dutch, was never relaxed. It was the French design to escape and combine, ours to destroy them singly as they came out. Early in January, 1805, Villeneuve, the successor of Latouche-Treville, left Toulon, and Missiessy slipped out of Rochefort, pur-

sued by Cochrane. This time Nelson made a bad appreciation. Villeneuve was not bound for Egypt, and much valuable time and space was wasted in looking for him there. He passed Gibraltar, took over six Spanish battleships at Cadiz, and headed westwards with seventeen battleships and seven frigates, followed, but very far behind, by Nelson with ten battleships and three frigates. Villeneuve reached the West Indies, where a regular game of hide-and-seek took place. Finally, the Frenchman made for home with Nelson after him, and news was sent ahead to England by fast ships. Arriving back in European waters, Villeneuve encountered Sir Robert Calder off Ferrol, and Calder, though outnumbered, and faced besides with the fleet inside Ferrol, decided to attack off Finisterre. The wind was light, fog came down, and some of our ships never got into action, but before night two Spanish ships struck. Next day the wind failed and the fleets could not approach each other, and the day following, with the wind in Calder's favour, he, torn between the two duties of engaging Villeneuve and watching the Ferrol and Rochefort fleets, held off. For this he was loudly blamed by the public at home, which was now accustomed to the dramatic successes of Nelson. He had had the best of a fight with a superior enemy and was faced by two other fleets. Probably he should have done the nearest job, but it was certainly a dilemma.

Villeneuve, after being damaged by Calder, collected twenty-nine battleships and entered Cadiz. News was rushed to England, and Nelson, who had

gone home for a brief rest, left Portsmouth on September 15 amid the wild demonstrations of the people. He went with eagerness to the fight, but with deep forebodings as to his own fate, taking with him his coffin, made for him out of the mainmast of *L'Orient*. On arrival off Cadiz he took command of a fleet of twenty-seven battleships, ranging from the *Victory,* his flagship, of 100 guns, to the *Polyphemus,* of 64. Villeneuve now had thirty-three battleships, of which fifteen were Spanish, the largest being the huge *Santissima Trinidad* of 130 guns. Nelson had not long to wait. Villeneuve came out on October 19 and found his way to Gibraltar barred. He went about again, and on October 21 the fleets met. The enemy was sailing north in a rough double "line ahead," and Nelson from the west attacked his centre in two columns, himself leading the port column and "that noble fellow Collingwood" the starboard in the fast *Royal Sovereign,* which left all her consorts behind. Nelson hoisted the immortal signal, "England expects that every man will do his duty," and, knowing the shoals of Cape Trafalgar to be ahead, ordered his Captains to be ready to anchor. The superior seamanship, gunnery, and discipline of the British fleet told their tale. The *Victory* was a mark for every ship that could reach her, but she more than held her own, and on breaking the enemy line found herself fouled by the *Redoutable,* from whose tops Nelson, a conspicuous mark with his orders and empty sleeve, was mortally wounded by a musket ball. He was carried below, and it was seen that nothing could save him. The battle went well, every

Photo : Cribb, Southsea.

NELSON'S FLAGSHIP VICTORY.

(IN BATTLE TRIM AS AT TRAFALGAR.)

facing p. 45.

Captain knowing exactly what was expected of him, so that little general direction was wanted. At 4.30 p.m. the great sailor died, knowing that his work was done, but characteristically dissatisfied to the last because only fifteen of the enemy had been accounted for when he had "bargained for twenty."

By 5 p.m. the fight was over, and all the enemy ships that could do so fled; but the weather now became bad, and it would have been better if Nelson's order to anchor had been carried out. Many of the prizes were lost in the gale, so that the full fruits of victory were not gathered, but the general results were beyond dispute. Bonaparte's game was up. There was no longer a shadow of a chance of invading Britain, and the battered *Victory,* towed by the *Neptune,* put into Gibraltar. On December 12 she arrived off Dover under jury masts with the body of the national hero. Never had so frail a body carried so magnificent a spirit, intensely human on one side, but unsurpassed in its complete devotion to duty and in flawless courage and skill. Jubilation and thanksgiving for victory seemed swamped in the national grief at his loss, and his example has ever since that date been held up for imitation not only in our own fleet but in every navy in the world. It is only fitting to give here the prayer which he wrote before the battle: "May the Great God whom I worship grant to my Country, and for the benefit of Europe in general, a great and glorious victory; and may no misconduct in anyone tarnish it; and may humanity after victory be the predominant feature in

the British fleet. For myself, individually, I commit my life to Him who made me, and may His blessing light upon my endeavours for serving my Country faithfully. To Him I resign myself and the just cause which is entrusted to me to defend. Amen, Amen, Amen."

We shall read that the British Navy was to see much service from that time, but for over a century there was no attempt to dispute its supremacy in battle.

Napoleon had already begun to realize that he could not break Britain's naval power, and the Battle of Trafalgar shattered any remnant of illusion which he may have harboured, though he had plenty of ships which, if well manned and led, could have disputed our superiority. A small French fleet of eleven ships got out of Brest and separated into two squadrons, but Admiral Duckworth with six ships went after them and took or sank five, while four of the remaining six were lost or taken in heavy weather elsewhere.

Napoleon then tried the destruction of our commerce, a plan which only brought on him an iron blockade of all his ports; but he managed to enlist Turkey as an ally in the Mediterranean, so Duckworth was ordered to Constantinople. He passed the Dardanelles, and sent in an ultimatum demanding a reply in twenty-four hours. The Sultan, as usual, shuffled and played for time, meanwhile strengthening his defences in the Straits. Duckworth allowed himself to be baffled and returned to the

Mediterranean, being badly battered at short range by the huge stone shot from the Turkish guns in the narrow channel; but the Turk was not allowed to emerge from his own waters, and therefore had little effect on the course of the war.

In 1807 the Russians, our nominal allies, turned against us, and with Napoleon tried to get control of the Danish, Swedish, and Portuguese fleets. Again, in order to baffle Napoleon, we had to coerce the brave Danes, whom we forced to give up their ships. In 1808 Collingwood in the Mediterranean tried vainly to bring the French to action, but they eluded him. Spain and Portugal, tired of Napoleon and his schemes, then joined us, which brought about the surrender of the Russian fleet in Portuguese waters to Admiral Cotton.

In 1809 the French Admiral Willaumez slipped out of Brest and joined another squadron in the Aix Roads, where Admiral Lord Gambier's fleet bottled him up. Gambier sent home for fireships to attack him, and Cochrane, a fiery and resolute officer, who had done brilliant work in the *Speedy* and *Pallas,* was ordered to conduct the operation. This resourceful officer prepared very thoroughly, filling one ship with explosives and turning others into fireships; but when more arrived from England and all was ready, Gambier began to doubt and hesitate, so that Cochrane finally started himself in the explosion ship. He encountered an unsuspected boom, which his ship fouled, but, luckily, he was able to get clear before she blew up, making a gap for the fireships to follow through. These did less harm than was

hoped, but the terrified French cut their cables and, with two exceptions, went ashore in very heavy weather. Cochrane, burning to finish the work, signalled that by prompt action they could all be destroyed, but Gambier again delayed till the fearless Cochrane attacked with a single frigate, when seven ships were sent to help him. Four enemy ships were destroyed, and then the whole fleet was ordered back. Gambier was recalled to receive the thanks of the nation, but Cochrane, maddened by the feeble conduct of the affair, and being himself a member of Parliament, opposed the vote. An inquiry followed, which upheld Gambier, and Cochrane's action was condemned by the influence of his enemies.

In this same year, 1809, took place the combined expedition to the Scheldt, where Napoleon was busy making great docks and forts. Sir Richard Strachan commanded the fleet, and the Earl of Chatham, who was said to be always either eating or sleeping, the land force of 40,000 men. The well-known epigram runs:

> "My Lord Chatham, with his sword drawn,
> Stood waiting for Sir Richard Strachan;
> Sir Richard, longing to be at 'em,
> Stood waiting for the Earl of Chatham."

But this did much less than justice to the bold and energetic Admiral, who was ill-supported by the dilatory and doubting General, so that the expedition was largely a failure.

In the Baltic Saumarez contained the Russians, who stayed at home; Senegal and Guiana fell to us; but at Grand Port, in the Island of Mauritius, all

the valour of Captain Pym and his small squadron failed to overcome a succession of strokes of ill-luck, and we lost four frigates. But at Port Louis, on the west of the island, Commodore Rowley was more successful, and the whole was captured in 1810. Next year Captain Hoste with four ships defeated the French Commodore Dubourdieu with twice his force in the Adriatic.

The year 1812 brought us into war with the United States, with whom there had been many causes of friction, not without blame on both sides. The American ships were few but very powerful of their type, and they were assiduously trained in gunnery, a science which had been neglected in the British fleet since Trafalgar, too much reliance being placed on seamanship. One after another our ships were taken, and it was not till June, 1813, that we scored a really notable success. Captain Broke of the *Shannon* with due ceremony challenged Captain Lawrence of the *Chesapeake,* a similar ship of the frigate type, to battle. Broke had given constant attention to gunnery, and the results were quickly seen, for the *Chesapeake* was soon overpowered and captured by boarding, after which she was towed in triumph to Halifax. Broke was wounded in the head, and Lawrence, who had fought gallantly, died of his wounds. On the Great Lakes both sides scored successes, but some combined operations failed through the defeat of our land forces. Peace was concluded in 1814, but before it could become known a British squadron under Captain John Hayes took the American frigate *President.* Thus ended for

ever, as we all hope, hostility between the British Empire and the United States.

With the exile of Napoleon to the Island of Elba, nothing remained for the Navy to do except the suppression of piracy, which still flourished on the North African coast.

In 1816 Sir Edward Pellew, soon to be Lord Exmouth, quickly overawed Tripoli and Tunis; but the Bey of Algiers, confident in his powerful fortifications, continued to commit the most barbarous atrocities, and Lord Exmouth, who had gone home for a short time, hastened out from England and attacked the city of Algiers by sea. After a long and furious bombardment the Bey gave in and was forced to accept the British terms. Minor troubles in Arabia followed, and then the long and tiresome first Burmese War, which was rendered necessary by the ill-treatment of British traders.

Owing to the shape of the country, the lack of roads, and the convenience of the River Irrawadi, this became a river campaign carried on by small craft, and it was notable for the employment of a steamboat. Resistance was desperate and the operations were difficult, but early in 1826 they were brought to a victorious conclusion.

Next year the atrocious treatment of the Greeks by the Turks and Egyptians brought intervention by England, Russia, and France. Efforts to avoid war failed, and the allied fleets under Admiral Codrington entered Navarino Bay, where the Turkish fleet was skilfully and appropriately drawn up in the form of a crescent. After four hours' fighting the Turkish

ships were all taken or destroyed. For some reason which is not clear, this action was at first disapproved by the home authorities.

Britain next found herself embroiled with China in consequence of the determination of the Chinese to keep out foreigners, whether they were merchants, missionaries, or armed forces. Future generations will no doubt decide whether outside nations had any right to force trade or penetration of any kind on an independent race whose one desire was to keep to itself, but there is little doubt that the policy which backed our traders in forcing the Chinese to deal in opium will be condemned. However the verdict may go, the British Navy, whose pride it was to fight fairly in fair causes, had to carry out the national policy, and from 1839 to 1842 it was used to compel submission, the Chinese on this occasion giving comparatively little trouble. At the same time, there were naval operations against the Egyptians, who had risen against Turkey. Little though we liked the Turks and the kind of government they stood for, considerations of foreign policy made it necessary to support them, which we did effectively.

Internal squabbles in Uruguay now engaged our attention, and when European residents found themselves in great danger order had to be restored by the active intervention of the combined British and French fleets in 1845. It was not an easy matter, but eventually success crowned our efforts.

In 1852 fresh complaints began to come in of the ill-treatment of our traders by the Burmese, and a combined naval and military expedition inflicted

severe punishment, and finished with the annexation of much Burmese territory and the setting up of orderly government.

No sooner was this over than the dark cloud of the Crimean War loomed up. Quarrels over the Holy Places in Palestine gave Russia a pretext to claim the right of protection over Christians in Turkey. This naturally meant Russian ascendancy and the occupation of Constantinople, which could not be tolerated. We were very unwilling to go to war, but neither we nor the French could accept such a situation. When affairs were at boiling-point the Russian fleet annihilated the Turkish fleet at Sinope in 1854, which enraged all Europe, and war followed. Most of the fighting was on land, but the Navy had its part in blockading the Russian fleet, destroying Odessa, stopping Russian trade, transporting troops and stores, and landing big naval guns for co-operation with the army. A marked feature of the earlier stages of the war was its mismanagement. In the Black Sea Admiral J. W. Dundas, seconded by the younger and more energetic Admiral Sir Edmund Lyons, was in command, and Admiral Sir Charles Napier was sent to the Baltic. Napier was very badly treated by the Admiralty, who would not provide suitable ships for the work involved; but he managed to play havoc with Russian trade and some of their ports, while the enemy fleet prudently hid behind its defences. Eventually Napier returned home, after doing nearly all he was told to do with inadequate forces; but the unthinking public was disappointed, and he was not employed again. In

the Pacific Petropavlovsk was attacked, but the affair was ill-handled and failed.

After the first terrible winter of 1854-55 better success attended the allied efforts. Sir Edmund Lyons succeeded to the Black Sea command, and he was not at all content with shutting up the Russians. The British Navy forced its way into the Sea of Azov, and found its coasts crowded with stores of all kinds, particularly corn from the huge harvests of South Russia, and vast quantities of coal. Fort after fort, store after store, were destroyed by the force under Captain Lyons, son of the Commander-in-Chief. In September the great fortress of Sevastopol fell after a stout resistance. This was followed by the capture of Kinburn, where armoured floating batteries of shallow draught were employed with deadly effect.

In the Baltic Admiral the Hon. R. Dundas succeeded Napier, and was given the mortars and gunboats for which Napier had appealed in vain. Here were not only fortresses of immense strength, but a new weapon, submarine mines, which were then called "infernal machines," which exploded when hit. Crude though they were, they could not be ignored, and means had to be devised for sweeping them up when located. The great fortress of Sveaborg was attacked and reduced to impotence, after which the fleet moved on to Kronstadt. Before operations could be renewed in the spring of 1856 peace was declared, Russia having agreed to the terms of the Allies.

The Crimean War made it quite certain that the old wooden line-of-battleship was doomed, though

conservative naval opinion clung tenaciously to the methods and weapons which had served the country so well and so long.

After the hardships of cold in Russia the British forces were called to endure equal privations in the furnace of the summer in India during the Mutiny of 1857. This time the Navy's part was very small, but Captain Peel's naval brigade, with its big 8-inch guns converted for field use, did exceedingly good work before Lucknow.

The second Chinese War, brought on by Chinese disregard of treaties, began in 1856, though on this occasion, as on the last, all the right does not seem to have been on our side. A far stouter resistance was encountered this time, and our losses were serious, but Canton was taken after much trouble. Canton, however, was in the south, and China is too vast a country to be conquered by success at one point only, so fresh operations had to be undertaken in the north. There was some pretence at negotiation by the Chinese, after which the Taku forts in the Peiho River were attacked and taken. Our demands were then complied with, and the trouble was apparently over; but when our Minister and that of France proceeded to Pekin in 1859 they were not allowed to land. More futile negotiations followed and a naval attack in the Peiho, which was repulsed with heavy loss on our side. Captain Tatnall, commanding the American warship *Toeywan,* assisted us by his boats, with the immortal remark: "Blood is thicker than water." 10,000 British and 7,000 French troops soon arrived, and in conjunction with the two navies fresh operations were

undertaken, with the result that the Chinese, after some four years of struggle, were finally defeated.

Similar troubles now occurred with the neighbouring country Japan, which hated and despised foreigners as much as China, and was equally determined to keep them out. Western traders, however, persisted in bringing their wares to the country, and when friction followed, as it generally did, the Western Powers were bound to protect their own people. Japan contained a number of proud and quarrelsome princes who did as they liked, and constant complaints of ill-treatment were made by British and other traders, and when open and unprovoked murder of British subjects occurred the use of force was inevitable. British, Americans, Dutch, and French joined in naval operations, and first Kagoshima and then Shimonoseki were destroyed. An indemnity was demanded and was paid in 1864, after which the amazing spectacle of Japan's adoption of Western civilization, wonderful in its rapidity and thoroughness, was witnessed, with the advance of that country to the very front rank among naval Powers in fifty years.

From 1864 to 1914, with the exception of small punitive expeditions and general police work, the British Navy saw little fighting, but its strength was such that no foreign Power cared to challenge it, even at the time of the Boer War of 1899-1902, when hatred of Britain was almost universal.

From this time the ambition of Germany for world dominance both on sea and land gradually became unmistakable, but, luckily for the British Empire, the

fact of it was recognized in time by statesmen, sailors, and soldiers alike, and the Navy, thanks largely to Admiral Sir John Fisher, was ready when the time came to act once more as the sure shield of Britain. The story of the last struggle will be told later on.

CHAPTER IV

DEVELOPMENT OF THE MODERN NAVY—I

During the many centuries in which sails and wooden ships were used progress was so slow as to be hardly perceptible. A good illustration of this is Nelson's famous flagship *Victory,* which was actually forty years in the very front rank of ships of the line, a period about double the whole life of the modern warship, most of which is spent in comparative obsolescence. With so vast a history, therefore, and such a bulk of precedent to appeal to, it is not surprising that radical innovations such as steam and iron construction were not welcomed by sailors either in the Royal Navy or the Merchant Service. They were in those days a conservative race, and poured scorn on "steam kettles." Boilers were untrustworthy, so were engines; coal was dirty and could never be anything else; and obviously, anything that came from a foundry was sure to founder. Did not wood float and iron sink? Then why in the name of common sense build ships of iron? There was something to be said for the conservative view. All innovations are imperfect, but turning a blind eye to progress does not stop it.

We shall now see how rapid changes were to be. The study of the development of ships is a fascinating one, particularly so in the case of ships of war. We shall see the battle, which is still undecided, between

guns and armour, between the torpedo and the various devices that were invented to defeat it, and the various theories of design which could never be conclusively proved.

We shall have to remember all the time that every ship is a compromise. We cannot put the maximum of gun-power, protection, speed, seaworthiness, handiness, etc., all into one ship. We can get most of them by building a ship of monstrous size, but very few harbours and fewer docks would take her; she would be a huge target for torpedoes, she would be very costly, and, last of all, she would only be supreme as long as no competitor was built in a hostile fleet. So whatever type we want must have the various qualities balanced to give the required result: guns and armour must predominate in battleships, engines and fuel in cruisers, and so on.

By 1830 the advance of steam had been too marked to be ignored by the most conservative of Admiralties, so five paddle-sloops were ordered. They were of 830 tons and 10 knots speed, and for safety as well as economy they were given masts and sails, the paddles being arranged to revolve idly when steam was not being used. For ships intended to fight paddles were undoubtedly a great drawback, being very cumbrous, vulnerable, and placed amidships, just where they would interfere most with the guns. Before long, however, the screw propeller was invented, which did away with most objections, being under water and right aft, where it did not interfere with anything. Complete dependence on steam was impossible with only one set of engines, and they of a crude and

wasteful type, so it was many years before masts and sails disappeared from the Navy.

The first line-of-battle ship built as a steamer was the *Agamemnon,* launched in 1852, and 230 feet long, but other ships were adapted to steam after being built. Fine specimens of the wooden screw-propelled battleship were the *Queen* and *Marlborough,* which, with their huge spread of canvas, were a notable sight in the sixties.

Progress began in earnest with the design of iron ships, as well as the restless competition of conflicting ideas as to what constituted the best types. Ericsson and Captain Cowper Coles (the latter first) had revolved in their minds the possibility of building ships very low in the water, so as to present a small target, but strongly armoured and mounting only a few guns, but these in revolving turrets to give the widest field of fire. Captain Coles' ideas were not adopted by the British Admiralty, but Ericsson in America was given a chance by the Northern States, whose wooden ships had been destroyed one by one by a Confederate ship called the *Merrimac,* an old ship cut down and armoured with slanting plates. Ericsson built the *Monitor,* so called to be a warning to the obstinate British Admiralty, which had rejected his plans. She was a very small ship, with only 2 feet of her sides above water, and one revolving turret of armour 8 inches thick carrying two 11-inch smooth-bore muzzle-loading guns. She duly fought the *Merrimac,* which could make no impression on her single turret, and found little else to hit, so after two hours the *Merrimac* hauled off, defeated. The *Monitor* had done her

work, and she was to have a great influence on warship design; but she lacked seaworthiness and reasonable comfort for the crew, so the British Admiralty adopted the alternative plan of a much larger ship carrying guns on the broadside. Even here the French were to some extent first in the field, as they cut down the wooden ship *Gloire,* and fixed to her sides a complete belt of iron armour 4½ inches thick, thus making her, instead of a two-decker wooden ship, a single-decked armoured one, with screw engines, and looking much like an ordinary frigate.

The British Admiralty did not like the possibility of having to fight an armoured ship with an unarmoured one, so they went one better by building the *Warrior* altogether of iron. The *Warrior* (see opposite) was a most notable and successful ship, and deserves some description. She was laid down in 1859 at the Thames Ironworks, whose last ship, the "Dreadnought" *Thunderer,* fought at Jutland. She was of 9,210 tons displacement, had screw engines of 5,270 horse-power, and could steam at the then remarkable speed of 14½ knots. Her length was 380 feet, equal to that of the standard battleships thirty years later, and she carried armour 4½ inches thick, not over her whole length, but for 218 feet of it, and her final armament, after several changes, was four 9-ton rifled muzzle-loaders, twenty-eight 6½-tonners, and a few light and machine guns. She was heavily rigged as a ship, and did much of her cruising under sail. Sails died hard, even twin-screws failing to kill them for a long time. Sails were regarded, and with reason, as the finest training for sailors, and

Photo: W. A. Richer.

H.M.S. WARRIOR. 1861. FIRST BRITISH IRONCLAD.

9210 TONS. 14½ KNOTS. WEIGHT OF ONE BROADSIDE 1½ TONS: ENERGY 61,476 FOOT-TONS.

Photo by the author.

H.M.S. RODNEY. 1927. LATEST BATTLESHIP.

35,000 TONS. 23 KNOTS. WEIGHT OF ONE BROADSIDE 9 TONS: ENERGY 847,458 FOOT-TONS.

"ANCIENT AND MODERN."

facing p. 64.

as late as 1903 boys were trained in sailing brigs and learned seamanship in the manner of their ancestors. The method certainly taught hardiness, handiness, and self-reliance as well as anything could. With the *Warrior* the sixty-year period had begun in which more progress was to be made than in the previous eight hundred. There can be no doubt that the Admiralty reasoning was correct. A great sea Power like Britain must have sea-going ships, not freaks that could neither steam nor fight in rough weather. The *Warrior's* chief feature was her 4½-inch armour, which could keep out any existing shell. The great duel between the gun and armour now began, and the artillery experts naturally set to work to produce a gun that would defeat the *Warrior's* armour. The next notable ship was the *Achilles,* of 9,820 tons and 14·32 knots. She carried fourteen heavy guns of 12 tons each and two 6½-ton guns, and her armour was increased from a partial to a complete belt of the same thickness as the *Warrior's*. Following her came the famous trio, *Minotaur, Agincourt,* and *Northumberland*. They were splendid ships of 10,600 tons, 400 feet long, about 14 knots speed, and with the same broadside arrangement of guns except that two of their seventeen 12-tonners were placed to fire right ahead. The armour belt was again complete, and was increased in thickness to 5½ inches. They were the biggest ships of their time, and with their five masts (for sails were still considered essential) and two funnels they were a very fine sight at sea. There was at this time, and for many years to come, a large party in the Navy that believed firmly in the ram as

a weapon, and all ships from now were built with ram-bows, to make the blow as deadly as possible under water. The existence of a complete armour belt enabled this to be done effectively. These three ships remained many years in the service, and were always regarded as fine sea boats.

The Admiralty, however, did not stick entirely to the sound policy of a sea-keeping fleet, but built a number of slow, small ships with bad sea qualities and little coal capacity. Though tough ships for their size and useful in calm weather, they were not meant to act in company, but were scattered about the coast in defiance of the principle that our frontiers were not our coasts but those of the enemy, and it might be said that they were hardly better than the Martello towers had been in their day. Such were the "Repulse" class of about 6,100 tons, cut-down wooden ships, and, later on, the *Hotspur, Cerberus,* and others.

The restless and original Captain Cowper Coles got his chance of testing the turret theory in one of these small ships, the *Prince Albert,* though the *Royal Sovereign,* another cut-down wooden ship, had partly embodied it. The *Prince Albert* was of 3,880 tons, 11½ knots, and carried four 12-ton guns in four turrets. She was successful as far as she went, but she did not satisfy her creator, who clamoured for a real sea-going, masted turret ship, and, spurred on by the Press, the Admiralty built the *Monarch,* of 8,300 tons. She carried two turrets on the centre line, each carrying two 25-ton muzzle-loaders; but the advantage of revolving turrets was largely wasted because she

also had a forecastle and poop, which obstructed their ahead and astern fire, to compensate for which the former carried two guns and the latter one. Also she was of moderate freeboard, instead of being cut down low to present a small target, so that she did not please Captain Coles. Her armour was 10 to 7 inches thick, and she could steam about 15 knots. Captain Coles agitated once more, and was eventually given a free hand in 1867. The result was the *Captain,* of 6,900 tons, rather smaller than the *Monarch,* about half a knot slower, and with less than half the *Monarch's* freeboard. In spite of his own criticism, when it came to the point Captain Coles embodied a forecastle and poop in his own ship, but he managed to abolish a good deal of obstructive rigging by fitting the *Captain* with tripod masts. The Press vehemently applauded, and the *Captain* was hailed as the finest ship afloat, though the professional advisers of the Admiralty were less confident and even suspicious, as were also Messrs. Laird, her builders. At first all went well. She passed her special stability tests triumphantly and did two successful cruises. On her third cruise, however, in September, 1871, under the command of Captain Burgoyne, and with Captain Coles on board as a guest to observe her behaviour, while in company with the rest of the Channel Fleet she met a gale at night off Cape Finisterre, and a sudden squall struck her while under sail. She had steam up, but was not using it, and on her second heavy roll she heeled over 28 degrees and then went down stern first. She was not missed till next morning, and only eighteen men succeeded in reaching

land, the rest, with her Captain and designer, being drowned. The court-martial found that she had been designed in deference to public opinion and in opposition to the views of the naval authorities. This disaster produced a deep impression, and an equally strong reaction now set in against turret ships of any kind, however well designed, which was only overcome after many years. Sir Edward Reed, the Chief Constructor, at this time introduced a modification of the old purely broadside arrangement of guns, in which all had been mounted in a row along the side, with very little attention to end-on fire. His ships mounted fewer guns but heavier, and he concentrated them in a central box-battery, with specially strong armour and recessed sides to give some ahead and astern fire, with a narrow but complete belt from end to end.

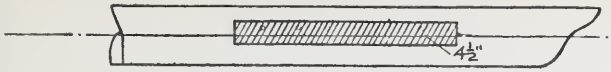
This was virtually an attempt to combine the advantages of turrets without their drawbacks, but, as usual with compromise of any kind, it was only partially successful. The ships were stoutly built and good steamers, and remained in the service for many years. A good example was the *Hercules* in 1866, of 8,680 tons, 6,750 horse-power, and more than 14 knots speed. She carried eight 18-ton, two 12½-ton, and four 6½-ton muzzle-loaders, and armour of 9 inches maximum thickness. About the same time the much smaller *Penelope* was built for coast defence with a 6-inch belt, eight 9-ton guns, and twin screws. The introduction of twin screws, associated with more reliable engines, did much to hasten the abolition of sails, since both engines were unlikely to break down

at the same time, and there was the further advantage that a ship with a disabled rudder could still steer roughly by "jockeying" with her screws. The advocates of the ram were to have another illustration of the deadly power of their favourite weapon. In 1875 the *Vanguard,* a battleship of the "Audacious" class of 6,010 tons, was rammed in a thick fog by her sister the *Iron Duke,* and sank in an hour, but without loss of life. The *Iron Duke* was only steaming at 6 knots and was practically uninjured, so the power of a successful attack by ram needed no further proof. Even a blow at such low speed was plainly more than the rammed ship could stand, but, on the other hand, it was clear without expensive experiment that in practice it was a very difficult weapon to use. Only a slight error in judgment of speed, course, or position was apt to turn the rammer into the rammed, a result as inconvenient as being hoisted with one's own petard; but all battleships and cruisers were now built with a projecting spur below the water-line at the bows to make the blow as deadly as possible, and to provide a "last resort" weapon.

The finest of the central-battery ships was the *Alexandra,* completed in 1877. With a tonnage of 9,490 and a horse-power of 8,600, she reached 15 knots on trial, carried four 25-ton guns, ten 18-ton guns, and four torpedo dischargers, and her armour reached a maximum thickness of 12 inches, tapering to 6 inches. She was at first given full sail power in spite of the security provided by twin screws, but not long before her end she was remasted and her sails disappeared. She was always a good steamer, and re-

mained on the Navy List till 1902. She took part in the bombardment of Alexandria in 1882, and was hit about thirty times without any great loss of efficiency.

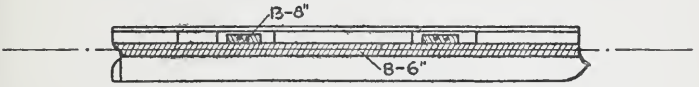
Meanwhile the turret ship, in spite of popular dislike on account of the loss of the *Captain,* had been steadily making its way. The main mistake in the *Captain's* design, though by no means the only one, was the combination of heavy masts and sails with very low freeboard, and the Chief Constructor, Sir Edward Reed, avoided this in his first sea-going turret ship *Devastation,* which was completed in 1873. She was a radical departure from all that had gone before, as can be seen in her plan. She was a low-freeboard ship of 9,350 tons, 6,650 horse-power, and nearly 14 knots speed. She carried two turrets, one forward and one aft of a light superstructure amidships, and each turret carried two 35-ton guns, which were the latest reply to the efforts of the armour makers, and each could revolve with an uninterrupted field of fire through about 240 degrees, so that for the first time the turret fully justified its existence, giving full fire-effect on both broadsides. The guns were still muzzle-loaders and therefore very slow in firing, but they were the most powerful weapons of their time. The *Devastation* carried 2,950 tons of armour in a complete belt of 12 to 10 inches thickness, the thickness on the turrets being 14 to 12 inches. The superstructure carried only the bridge, funnels, boats, and a single mast without sails. The Press, which had urged the construction of the unsound *Captain,* almost unanimously condemned her, and certainly to the eye, whether of sailor or artist, she was hideous; but



WARRIOR. 1861. FIRST BRITISH IRONCLAD.

AGINCOURT. 1868. COMPLETE BELT.

HERCULES. 1868. HEAVIER GUNS IN CENTRAL BATTERY.



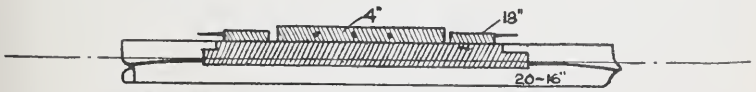
CAPTAIN. 1870. LOW FREE-BOARD TURRET SHIP.

DEVASTATION. 1873. TURRET SHIP WITHOUT SAILS.

INFLEXIBLE. 1881. THICK ARMOUR OF SMALL AREA.

ANSON. 1889. BARBETTES. SECONDARY GUNS APPEAR.

VICTORIA. 1888. 2 - 110 TON GUNS.



TRAFALGAR. 1890. VERY COMPLETE PROTECTION.

REPRESENTATIVE BATTLESHIPS—I.

Punch in a cartoon represented Britannia sensibly telling the disgusted Father Neptune that "handsome is as handsome does." She succeeded in confounding all her critics, and passed all tests without a hitch. She was wonderfully steady, but being very low in the water she was apt to be washed from stem to stern in any sea, and was therefore uncomfortable, but as no water could get below her safety was unimpaired. Not long after a sister ship, *Thunderer,* followed, which was equally successful; but she demonstrated the danger of pairs of very heavy muzzle-loading guns by an accident which entailed some loss of life. She fired a pair of guns together, and it was thought that both went off; but on reloading for a second discharge one gun burst, and it was found that the first charge had never left the gun, and the double loading was too much strain on it. Naturally, such a thing could not happen with a breech-loader, and Britain, which had lagged behind France and other countries in adopting breech-loaders, began to pay more serious attention to that system. Following *Thunderer* came a larger ship of similar design called *Dreadnought,* of 10,820 tons, 8,210 horse-power, and only 12½ knots speed. She was completed in 1875. Her guns were 38-tonners, much better weapons with better shells, and two torpedo-tubes were added to her equipment. Her belt armour was again increased to 14 inches and bulkheads to 13 inches, with turrets of 14 inches.

Looking back fourteen years to the *Warrior,* we find that tonnage has only risen from 9,240 tons to 10,820, speed (with some exceptions) has gone back

from 14·3 knots to 12½, the number of guns carried has been reduced from thirty-two to only four, but their size has been increased from 9 tons each to 38 tons, while armour has increased from 4½ inches to 14, so busy had the artillerists and armour experts been in defeating each other. Moreover, the torpedo has made its ominous appearance, with far-reaching results on ship design and tactics. Twin screws have come to stay and sails have gone, with all their romantic associations.

During the period we have considered there were very few notable cruisers—indeed, perhaps only three need be mentioned. The first, *Inconstant,* was launched in 1868, and was of 5,780 tons and 16 knots speed. She was fast for her time and was always a good steamer. She carried no armour; and an armament of ten 12-ton guns and six 6½-tonners. She was followed the next year by the *Active,* of only 3,080 tons and 15 knots speed, and instead of a small number of big guns she carried eighteen 64-pounders. In 1876 came the *Bacchante,* of 4,130 tons, 15 knots speed, and fourteen 7-inch and two 64-pounders. Her strong point was the distance she could steam at economical speed, which was over 4,000 miles, or more than double that of the *Active*. A large radius of action is important in all ships of war, but particularly so in a cruiser. The first armoured cruiser built for the British Navy was the *Shannon,* of 5,390 tons, which had a narrow armour belt 9 inches thick, and she was like the *Inconstant* in carrying a heavy armament—two 18-ton muzzle-loaders able to fire right ahead, and seven 12½-ton guns, quite without

protection. Her speed was only 12½ knots, so that she could neither fight the existing battleships nor run away from them, and it is hard to see what was in the minds of her designers. She was followed, however, by two larger editions, *Nelson* and *Northampton,* of 7,630 tons, 6,640 horse-power, and nominally 14¼ knots speed. They carried four 18-tonners and eight 12-tonners, with two above-water torpedo-tubes. They resembled the *Shannon* in only having a partial belt of armour and in being given removable rams, which were to be fixed in position when war should break out. As a matter of fact, they always carried their rams, without damaging anything. The *Nelson* was a good steamer, but the *Northampton* was conspicuously bad. Both were heavily masted, and under sail the *Nelson* again showed herself far the better of the two. Much faster ships were the *Iris* and *Mercury,* of 3,750 tons and 18 knots speed, built of steel and carrying ten 64-pounder guns.

Taking up again the story of the battleship, we find that for the moment the gun has got the best of it, and the problem before the designers was still how to produce the best balance of armament and armour. Sir Edward Reed resigned his post as Chief Constructor after completing the *Devastation,* owing, it was said, to the ignorant criticisms passed on her, and Mr. (afterwards Sir) Nathaniel Barnaby succeeded him. One or two more central battery ships were built, of which the last was the unique *Téméraire,* which combined the central battery with the "barbette" system. A barbette is more or less a non-enclosed turret—that is, the mounting of the guns

revolves inside armour, but the guns are on top of it. The *Téméraire,* which was of 8,540 tons, 7,520 horse-power, and 14½ knots, carried two 25-ton guns, one forward and the other aft, on special mountings, by which they were loaded under cover and elevated for firing by hydraulic power, after which the recoil returned them to the loading position. She carried two other 25-tonners and four 18-tonners on the broadside, with two torpedo-tubes. She was finished in 1877, and in 1882 was present at the bombardment of Alexandria, where she did more damage than any other ship.

The *Téméraire* was, at best, an ingenious mongrel, and the advantages of the turret system were so great that it could not be abandoned. It was accepted that at this time no complete armour belt thick enough to keep out the heaviest shells could be provided, so the pendulum made a violent swing, and a policy was adopted of providing the thickest armour over a small surface instead of a moderate thickness over a large surface, leaving the rest of the side open to penetration, and guns were kept down to four in number, but of huge size. To compensate for the absence of complete side armour, an armoured deck just below the water-line was included, which was expected to keep the ship afloat. The first ship to embody this system was the *Inflexible,* completed in 1881. Her tonnage was 11,880, horse-power 8,010, and speed 13·8 knots. She was given huge beam in relation to length—75 feet to 320 feet—which made high speed out of the question. Each of her two turrets carried two 81-ton guns, muzzle-loaders,

which was a great leap from the 38-tonners of the *Dreadnought*. Their projectiles weighed about two-thirds of a ton, and could penetrate 22 inches of iron at 2,000 yards (if they happened to hit it) against the 16 inches of the 38-ton gun. These monsters were, however, not accurate weapons, and they fired only once in five minutes. To confine the ship's main offensive power to only four such guns seemed hardly sound; but the Italians had gone still further, and it was considered essential to follow them. The two turrets were arranged in a novel way. Instead of being both on the centre line, one at each end, with a superstructure between, they were concentrated amidships, diagonally—that is, the forward turret was somewhat on the port side, and the after turret on the starboard, with a light superstructure at each end covering the centre line, so that theoretically both turrets could fire either ahead or astern and on either broadside. Practically, however, the superstructure interfered, and the broadside fire of each turret was partially masked by the other. The armour covering the bases of the two turrets was increased to the monstrous thickness of 24 inches, but it was only 110 feet long, or one-third of the ship's length, and the rest of the side

> "Lay bare as the paunch of the purser's sow
> To the hail of the Nordenfeldt."

This central battery was completed at each end by bulkheads 'thwartships of 22 inches in thickness, and as the turrets themselves were 17 inches thick the battery was as safe as it could be made. The armour,

in addition to being thicker than any other before or since, was a new compound of iron and steel, which was calculated to break up shells on impact. The *Inflexible* was a museum of novelties besides her enormous guns and impenetrable armour. She had hydraulic mechanism for turrets and guns (though the *Dreadnought* was before her in this); she carried submerged torpedo-tubes, electric light, and a device by which water was let in to counteract rolling. She had also a special arrangement for loading the guns outside the turrets, because they were too big to run back for the purpose. Though she was quite incapable of moving under sail, she was given an absurd brig rig, which was removed later on. Her first Captain was John Fisher, later Admiral-of-the-Fleet Lord Fisher, whose reported plan, in case of meeting another *Inflexible,* was to keep away till night and then get in with torpedoes! There was naturally a great deal of criticism of the ship, whose extravagances were obvious; but two pairs of ships were built on the same general plan, the first pair, *Ajax* and *Agamemnon,* sharing all the *Inflexible's* defects. They were of 8,660 tons and dismally slow and unwieldy. They carried four 38-ton muzzle-loaders and two 6-inch breech-loaders. The second pair, *Colossus* and *Edinburgh,* completed in 1886, though still very open to criticism owing to their faulty disposition of guns, were a great advance on the *Inflexible,* as on a displacement of 9,420 tons and horse-power of 7,500 they could steam 15½ knots, and carried four new pattern 45-ton breech-loaders and five 6-inch 4½-ton breech-loaders. The former

had not the smashing power of the *Inflexible's* monsters, but they could fire far quicker and were more accurate. The system of large unarmoured areas of side had brought its own Nemesis, as the smaller guns now introduced were meant to attack and destroy them by rapid fire, which they could easily do, and it is noteworthy that serious attention now began to be given to the growing menace of the torpedo by the provision of steel nets which could be let down all round a battleship at anchor at some distance from the side like a crinoline, to entangle and keep off this new weapon. To the unceasing struggle between gun and armour is now added that between big ship and torpedo. The first torpedo-boat was built in 1873 by Thornycroft of Chiswick for the Norwegian Government. She was only good for about 15 knots, displaced only 7½ tons, and attacked by towing her torpedoes across the enemy's bows; but in 1879 the same firm built for the British Admiralty the *Lightning,* of 27 tons and 19 knots speed, and she was very soon fitted with a bow torpedo-tube for launching a locomotive torpedo. At first no real antidote to the torpedo was discovered, and men were stationed along the sides of attacked ships to keep off torpedo-boats with rifle fire. Luckily, the torpedo itself was for years an extremely inaccurate weapon with a very limited range.

In the meanwhile the advocates of the ram were not idle, and two ships, *Conqueror* and *Hero,* launched in 1881 and 1885, were built in which the ram was intended to be one of the main weapons. They were only of 6,200 tons, and were a radical

departure from the *Inflexible* idea. They were very low forward, and carried one turret for bow and broadside fire only, with a superstructure aft. The two turret guns of 45 tons had a very wide arc of fire, and were meant to fight end-on, firing first and then charging with the ram. On the superstructure were mounted four 6-inch guns, and the armour belt was almost complete. Their low freeboard forward made them bad steamers in any sea, when their speed of 15 knots fell at once to about 11, and their stern fire was nil. The ram enthusiasts, however, were not satisfied with them, and demanded a vessel for ramming only. The result of their efforts was a remarkable ship called *Polyphemus,* of 2,640 tons and nearly 18 knots speed. She was cigar-shaped, with an almost submerged hull and a rudder forward as well as aft to give her great handiness. She had only a very light superstructure. Her design was soon modified so that she could carry torpedo-tubes, no less than five in number, one fixed in the bow and the others in pairs on each side. She carried in addition six 6-pounder guns and two machine-guns. She was never tested in action, but might have done deadly work if called upon. The only real test she ever had was against a harbour boom, which she charged and penetrated as if it had been so much blotting-paper.

It should be explained that there have been three ways of describing the size of guns in the Navy. In Nelson's day they were known by the weight of the projectile—*e.g.,* 68-pounder—but when, with the coming of steam and iron, guns were increased in

size, they were known as 9-tonners, 38-tonners, 81-tonners, etc., the figure being the actual weight of the gun without mounting. After this they were also known by the "calibre"—that is, the diameter of the bore, which is the same as that of the projectile, in inches, so that we have the 9·2-inch, 12-inch, etc. For the small guns, such as 12-pounders, etc., the weight of the shell is still given.

The *Colossus* and *Edinburgh* were followed by another batch of ships, the six "Admirals," again on a new design, but still embodying the principle of thick armour or none. These were the *Collingwood, Rodney, Howe, Anson, Camperdown,* and *Benbow,* and as they differ in important respects from each other the following table best shows their characteristics.

	Collingwood.	*Howe* and *Rodney.*	*Anson* and *Camperdown.*	*Benbow.*
Displacement	9,500	10,300	10,600	10,600
Horse-power	9,500	11,500	11,500	11,500
Speed (knots)	16·5	16·7	17·2	17·5
Guns	4 12″, 6 6″	4 13·5″, 6 6″	4 13·5″, 6 6″	2 16·25″, 10 6″
	(All with a few light guns.)			
Armour:				
Belt	18–8″	18–8″	18–8″	18–8″
Barbettes	14–12″	11½–10″	14–12″	14–12″
Bulkheads	16–6″	16–6″	16–6″	18–6″
	Torpedo-tubes: 2 submerged and 4 above water.			

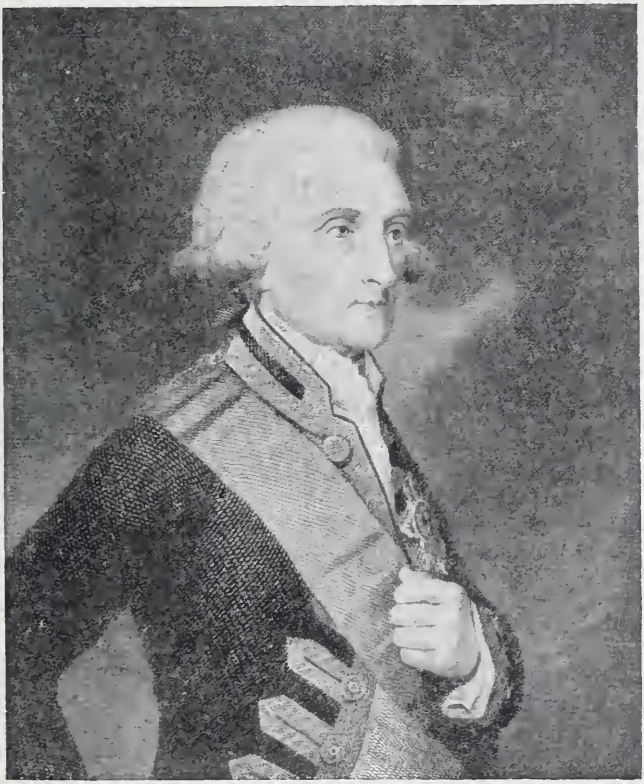
The 12-inch 45-ton gun of the *Colossus* was used in the *Collingwood,* but in the next four a new gun, of 13·5 inches and weighing 67 tons, was adopted, while in the *Benbow* a large jump was made to the

huge 16·25-inch 100-tonner, the largest gun mounted in our Navy at any date. All were, of course, breech-loaders, and the power of each rose from 18,060 foot-tons in the 12-inch to 35,560 in the 13·5-inch, and then to 57,580 in the 16·25-inch. The penetration of the last gun was as much as 29 inches of iron at 2,000 yards. As usual, however, advantage in one direction had to be paid for by drawback in another. The 110-ton gun could only fire once in five minutes, it was not too accurate, it was apt to droop, and its life was very short—only some 100 rounds. Most officers therefore preferred the four 67-tonners. It will be noticed that the secondary armament, firing a 100-pound shell with fair rapidity, tends to increase in number. It was primarily for smashing unarmoured parts of the enemy's hull, and secondarily for repelling torpedo craft. All these ships carried their main guns in barbettes, which, as we have stated, differed from turrets in that the armoured portion was stationary, and the guns and mounting revolved inside, the guns themselves being placed, without protection, on the top. Though the freeboard was low, the height of the guns was sufficient. The total weight of armour was only 2,500 tons, and the speed in anything but smooth water fell off rather badly.

The contemporary cruisers showed equal signs of unbalanced design, the *Amphion, Arethusa, Leander,* and *Phaeton,* of 4,300 tons and 17 knots, being only a shade faster than the battleships; but the armament of ten 6-inch and twenty light guns was very heavy for the displacement, and the coal supply of 1,000

tons was good. They were followed by the *Forth, Mersey, Severn,* and *Thames,* of 4,050 tons, 17 knots speed, and the still heavier armament of two 8-inch, ten 6-inch, and fourteen light guns, but only 900 tons of coal. The "Amphions" had a large patch of armour 1½ inches thick amidships, but the "Merseys" trusted to a deck 3 to 2 inches in thickness. Two armoured cruisers, also embodying the Barnaby theory, were completed about 1886, which were pretty good ships for foreign stations, where large battleships were not to be expected, but not fast enough to escape if they met any. These were the *Impérieuse* and *Warspite,* of 8,400 tons and 10,000 horse-power, with a speed of 16¾ knots. They carried four 24-ton guns, disposed in the French fashion, one at each end and one on each side amidships, with six 6-inch guns and six torpedo-tubes. The big guns were protected by 8 inches of armour, and on the side was a comparatively small patch 10 inches thick, with 9-inch bulkheads and 3-inch deck. This design was never repeated, but the pair remained on the active list for many years.

Coming back once more to battleships, we find the restless designers of this era making yet another change. The design of the *Conqueror,* which was meant partly as a ram and carried only one turret, firing forward and on either broadside, was adopted for two first-class battleships, the *Victoria* and *Sans-pareil,* which were completed in 1889. They were of 10,470 tons, 14,000 horse-power, and 16¾ knots, and in their only turret, which was placed forward, were two of the monster 110-ton guns like those of



Lord Rodney.

the *Benbow;* but in order to give some stern fire a 9·2-inch gun of 22 tons was mounted aft on the superstructure, and the secondary armament grew to twelve 6-inch guns and twenty-one light guns with six torpedo-tubes. The side armour was much less extensive than in the *Conqueror,* but was 18 to 16 inches thick, with 18 inches on the turret, 2 inches on the secondary battery, and an armoured deck. These were fine ships in their way, but, like all low-freeboard ships, subject to loss of speed in rough weather, and undoubtedly it was a mistake to confine the main armament to only two guns, even though they were monsters of over 100 tons.

The *Victoria* had a tragic end in June, 1893, when she was the flagship of Admiral Sir George Tryon in the Mediterranean. Sir George was universally regarded as a most competent officer, and one who was always ready to discuss any manœuvre afterwards, but who regarded remonstrance beforehand as a very different thing. On this occasion the fleet was steaming in two lines, six cables (1,200 yards) apart, and he proposed to turn both divisions simultaneously inwards, each division following its leader. His Flag-Captain pointed out that this distance was not enough, and that a collision would follow; but after first agreeing he ordered the distance to be kept at six cables instead of the necessary eight. When the signal was made, Rear-Admiral Markham, who was leading the other line in the *Camperdown,* at once appreciated the same point, and kept his answering signal at the dip to show that he did not understand, but he was asked what he was waiting for. He rapidly concluded,

knowing the character of his chief and his unquestioned competence, that the *Victoria's* division was meant to circle round *outside* his own, though that was not indicated in the signal. It was natural that he and the Captains of both ships should be perplexed between their apprehensions of danger on the one hand and the strong sense of discipline and confidence in their chief without which no force can exist. The movement began, and it was quickly seen that the expected collision was inevitable. Everything possible was then done, but it was too late. Only after three requests was the *Victoria's* Captain allowed to go astern with one screw and the Rear-Admiral's ship, *Camperdown,* crashed into the *Victoria* forward. Though at the moment of impact the *Camperdown's* speed was only five knots, her ram made a huge hole through which the water poured. A bulkhead which might have saved her was smashed in, and the *Victoria* sank lower and lower forward till, ten minutes after the blow, she turned over and sank. 321 officers and men, including the Admiral, were drowned, and 338 were rescued, one of the survivors being one who was to win fame in later years, Lieutenant J. R. Jellicoe. It will never be known what was in the mind of the Admiral, but his last reported words were: "It is all my fault." It was one more illustration, both of the power of the ram and the hazard of using it, since the *Victoria* might as easily have sunk the *Camperdown. Camperdown* was herself severely damaged, but was in no danger of sinking. The court-martial exonerated the *Victoria's* officers, but blamed Admiral Tryon, Rear-Admiral

Markham for not making his doubts clear, and the *Camperdown's* Captain for not providing for a collision which he expected.

After the *Victoria* was designed, quick-firing guns and high-explosive shells produced a reaction against the "all or nothing" theory in guns and armour of Barnaby's regime, and the next two ships, *Nile* and *Trafalgar,* were notable for their very complete area of protection. They were completed in 1890, and were of 11,940 tons, 12,000 horse-power, and $16\frac{3}{4}$ knots speed. Their four 13·5-inch guns were carried in two turrets, fore and aft, but there were only six 4·7-inch guns for secondary armament as compared with the *Victoria's* twelve 6-inch, with a few smaller guns and four torpedo-tubes, of which two were submerged. The great feature of these ships, the armour, covered two-thirds of their length with plating 20 to 16 inches thick and 16 to 14 inch bulkheads, and above that there was a battery covered with 4-inch armour for the secondary guns, with the usual deck fore and aft below the water-line to ensure buoyancy and to strengthen the ram. Inside the armoured redoubt there were the two massive turrets, 18 inches thick. The total weight of armour was 4,230 tons, as against 2,500 in the "Admirals." The First Lord of the Admiralty predicted at the launch of one of these ships that they would probably be the last battleships built, as the ship of the future would be fast, light, and unprotected. This prophecy has been made very often since then, but time has always proved its falsity.

In cruiser policy it began to be clearly recognized

that cruisers must be distinctly faster than contemporary battleships if they were to carry out their work properly, and the seven cruisers of the "Aurora" class were completed about 1889, in which ships small size, adequate protection, and a good armament were combined with high speed. They were of 5,600 tons, 8,500 horse-power, 18 knots speed, and carried two 9·2-inch guns, ten 6-inch and lighter pieces, and a partial belt of 10-inch armour, with 16-inch bulkheads and a 3 to 2 inch deck. They were very good value for their displacement, and did good work for many years.

Sir Nathaniel Barnaby was now succeeded as Chief Constructor by Sir William White, who had formerly been in Admiralty service and left to become designer to the famous firm of Armstrong. His period of office showed throughout a steady, ordered progress with no violent changes in design, but it is fair to say that the experiments made by his predecessor were of great value during the years of rapid progress, and that his success was founded on their results.

Sir William's first battleships were the famous eight —*Royal Sovereign, Royal Oak, Repulse, Resolution, Revenge, Ramillies, Empress of India,* and *Hood.* They were of uniform design except that *Hood* alone had turrets and the rest barbettes. The displacement was raised to 14,150 tons, horse-power to 13,000, and speed to 17·5 knots with forced draught. They (all except *Hood*) had high freeboard and two pairs of 13·5-inch guns mounted fore and aft, with ten 6-inch quick-firers of a new pattern between, and sixteen

6-pounders, twelve 3-pounders, and ten light guns. The intention was that the heavy guns should attack armour, the 6-inch the upper works and unprotected spaces, and the lighter guns repel torpedo craft, which became more dangerous every year as the torpedo itself became more efficient. There were, however, some critics who held that the greater rapidity of fire of the 6-inch gun, and the consequently greater volume in any given time, rendered the heavy gun less valuable; but it is pretty obvious that if reliance were placed on the 6-inch gun alone it would be countered by the enemy holding off at long ranges at which the heavy gun alone would count. The "Royal Sovereigns" were well protected with 18 inches of compound armour amidships, 16 inches on the bulkheads, 5 inches above the belt, 17 inches on the barbettes, and a deck of 3 inches. There was no class of battleships to compare with these in all-round fighting quality, and there was a considerable gain in the fact that they were practically homogeneous, and therefore able to act with full efficiency as a fleet. All were completed by 1895.

We must now turn to the torpedo-boat, whose progress was at least as striking as that of the larger ships. We have already mentioned the first British torpedo-boat, *Lightning,* which was built in 1877, and aroused a suspicion that the new weapon was likely to have a profound influence on tactics and ship design. At first there was a tendency to regard it as the weapon of the weaker Power, not for the navy whose frontiers were the enemy's coasts, and the first nation to build torpedo craft extensively was the Russian, which

ordered no less than 100, probably believing that sea predominance was to be bought thus cheaply. The British Admiralty, though pleased with the *Lightning,* was more cautious, and only built twelve boats of about 18½ knots designed speed. All greatly exceeded this speed, one nearly reaching 22 knots, but for some years no more first-class boats were built, the Admiralty being content with smaller boats for harbour work or carrying on the decks of the big ships. These were of only 17 tons displacement and 17 knots, and fired their torpedoes from dropping gear, which necessitated stopping the ship first. By 1884 Russia had 115 boats, France 50, and Britain only 19. A lecture by Mr. Alfred Yarrow drew public attention to this fact, and the Admiralty, having defeated the Treasury, ordered two first-class boats from Thornycroft and two from Yarrow, the two great firms whose skill and enterprise did more for small-craft design than all others combined. The new boats promptly proved their value in manœuvres, and in 1885 twenty-seven more were built by Thornycroft, twenty-two by Yarrow, and five by White of Cowes. They were larger than the others and reached 21 knots easily. Naturally, service in craft so small and so fast was far from comfortable, and hardened seamen suffered a good deal from sea-sickness. Each boat carried two 3-pounder quick-firing guns, two tubes, and four torpedoes. The sudden decision by Britain not to be left behind rather scared the other Powers, and soon even Chile, Turkey, and China took part in the race. The United States alone held aloof except for one small boat. Japan, whose navy had British instructors,

experimented with an armoured boat, which was able to keep out machine-gun bullets. The British and French manœuvres proved that no boat less than 100 feet long could be called "sea-going," and it was found that even the larger ones were nearly useless in heavy weather. Moreover, they could neither break a blockade nor drive off a squadron of big ships. Nevertheless, they were a menace that no Power could afford to neglect. Any further increase in size meant better sea-keeping qualities, but at the same time increased liability to destruction—their very smallness, combined with high speed, was their best protection.

As progress went on the risk to large battleships had to be countered by some means other than quick-firers and torpedo-nets, as torpedoes were now fitted with net-cutters, so a special new class of gunboats was evolved for the job of hunting down torpedo craft. Obviously, they had to be larger, more heavily gunned, and fast enough to overhaul their prey. The class was miscalled "Torpedo-catchers," which was wrong in two ways. Firstly, they were not meant to catch torpedoes; and, secondly, they turned out to be too slow to catch the boats themselves. The first was the *Rattlesnake,* of 550 tons and 18½ knots speed, with one 4-inch gun and six 3-pounders. The 4-inch gun was big enough to smash any torpedo-boat, but the speed was quite inadequate to catch one. She was followed by one class after another, all with the same merits but with the same defect of slowness. Over thirty boats were built with pathetic obstinacy up to 1892. In smooth water they were hopeless for their work, but they might have had a chance of

doing some torpedo work of their own in the scuffle of a fleet action.

We must now see what Sir William White was doing in the design of cruisers. It was by this time firmly grasped that cruisers must be numerous to carry out their multifarious duties, usually small, and always fast enough to avoid battleships of their own date. The Navy had been allowed to lag behind its chief rival, the French fleet, owing to Government parsimony; but a national agitation brought a realization of the risks we were running, and under the Naval Defence Act of 1889 no fewer than seventy ships were ordered, including ten battleships and forty-two cruisers of various sizes. Eight of the ten battleships were the "Royal Sovereigns" just described, but the other two were designed for foreign service, and therefore were of light draught in order to pass through the Suez Canal. They were the *Centurion* and *Barfleur,* of 10,500 tons, 18½ knots, with four 10-inch, ten 4·7-inch, and smaller guns. They carried only 12 inches of armour on the side and 9 inches on the barbettes. The cruisers were of various classes. Two, the *Blake* and *Blenheim,* were large ships of 9,000 tons, 20,000 horse-power, and nominally 22 knots speed, and they carried the satisfactory armament of two 9·2-inch and ten 6-inch guns, with eighteen smaller. Then there came the smaller *Edgar* and eight sisters of 7,350 to 7,700 tons, 12,000 horse-power, 20 knots speed, and practically the same guns as the *Blake,* except two of the class, the *Royal Arthur* and *Crescent,* which had two extra 6-inch guns forward instead of one 9·2. They carried also the new 18-inch

torpedo, which was much more powerful than the old 14-inch. The *Crescent,* it should be noted, was at one time commanded by the present King when Prince George. There were also a swarm of twenty-one second-class cruisers known as the "Apollo" class. These were useful ships of 3,400 to 3,600 tons, the difference of 200 tons being made up of the copper sheathing which was added to enable some to go longer without fouling below the water-line. They were, on the whole, good steamers, able to approach their maximum speed of 20 knots. Their horse-power was 9,000, and they carried two 6-inch guns, six 4·7-inch, and the usual light guns. Several of the class achieved fame, the *Melampus* being commanded for a time by Prince George as he was then, now King George V.; the *Scylla,* under Captain Scott, demonstrating the extraordinary possibilities of gunnery under a new system of training which put all previous practice to shame; and the *Iphigenia, Thetis, Intrepid, Brilliant,* and *Sirius* taking part in the immortal operations against Zeebrugge and Ostend in their old age. They were followed by eight "Astrea" class, of 4,360 tons, 9,000 horse-power, 19½ knots, two 6-inch, eight 4·7-inch, and light guns, and the 18-inch torpedo instead of the 14-inch. They were rather tougher ships than the "Apollos" and more sea-worthy, but otherwise were not much of an advance. Two third-class cruisers, *Barham* and *Bellona,* of 1,830 tons, about 18 knots speed, and six 4·7-inch guns, completed the tale of cruisers.

CHAPTER V

DEVELOPMENT OF THE MODERN NAVY—II

The time had now come when the failure of the torpedo-catcher, later called torpedo gunboat, had to be recognized, and an entirely new type was designed. The first of the batch was the *Havock,* in 1893, from the famous yard of Yarrow. The new departure involved a sacrifice in size, toughness, and some sea qualities, and instead the new craft had great length and low freeboard, associated with locomotive boilers and very powerful engines running at a high rate of revolution. *Havock* was therefore of only 220 tons displacement, against over 1,000 in the last torpedo gunboats, but the same horse-power, 3,500.

Her dimensions were 180 feet length by 18½ beam and 5¼ draught. By cramming this power into so small and narrow a hull a speed of 26¾ knots was attained, which was much more than any other torpedo craft could do; but in order to achieve it all weights were cut down to a minimum, so that in comparison with the "catchers" she was decidedly flimsy. She was able, however, to keep the sea whenever torpedo-boats could, and could overhaul them and destroy them by gunfire, as she carried one 12-pounder and three 6-pounder guns. It was decided to call the class torpedo-boat destroyers, a clumsy title that the laconic Navy soon reduced to "destroyers." Her success was so plain that a large programme of

destroyers was decided upon in order to cope with the real peril from across the Channel, and progress was very rapid.

Great ingenuity and enterprise were shown by the builders, especially Messrs. Thornycroft (Yarrow's great rival), Laird, White of Cowes, Palmer, the Fairfield Co., and many others, who were given a fairly free hand by the Admiralty in developing the best type. *Havock* and her four sisters, which had been fitted with the locomotive boiler, were followed by the very successful "Boxer" class from Thornycrofts, with water-tube boilers, which were of slightly greater dimensions, and 4,500 horse-power, which gave them a speed of 27 to 28 knots. In addition, they mounted two more 6-pounder guns than *Havock* and were rather better sea-boats. By 1896 more than forty destroyers were completed, nearly all of which attained the very high speed demanded, and the success both of the type of craft and the new type of boiler was assured. The "27-knotters" were followed by the "30-knotters," typified by Thornycroft's *Desperate,* in which length was increased to 210 feet, tonnage to 275, and horse-power to 5,800. There were also a few like the *Albatross,* an experimental type in which still greater size was associated with nearly 8,000 horse-power and a speed of 32 to 33 knots; but the attainment of this speed was a matter of great difficulty, and breakdowns, owing to the quick revolutions of lightly built engines, were frequent.

In these vessels the fixed bow torpedo was abolished, as after firing the destroyer was found to run over the torpedo, which soon gathered way and hit the parent

ship behind, with results which would be inconvenient in war.

Turning again to battleships, we find the "Royal Sovereigns" succeeded in 1895-97 by the nine fine ships of the "Majestic" class, the others being named *Magnificent, Prince George, Victorious, Mars, Cæsar, Jupiter, Hannibal,* and *Illustrious.* They were of 14,900 tons and were an improvement in several respects. Instead of 13·5-inch guns there were four wire-wound 46-ton guns of 12 inches calibre, powerful and faster-firing than their predecessors, and instead of lying exposed on the top of the barbettes each pair was in a revolving hood, strongly armoured. There were also twelve 6-inch guns, sixteen 12-pounder guns, and four 3-pounders, with five torpedo-tubes. The armour was of the new Harvey steel, and advantage was taken of its better quality by reducing its thickness on the side to 9 inches. With 12,000 i.h.p. they reached a speed of 17·5 knots. A smaller battleship for foreign service, the *Renown,* of 12,350 tons, 18 knots speed, four 10-inch guns and ten 6-inch, was also built.

An important change was now to come. For years the French had experimented with water-tube boilers, as we had ourselves in small craft like destroyers, and it was decided to apply the system to big ships. The advantages from the military standpoint were great. Instead of a large quantity of water in a big cylinder with small tubes running through it for the fire to enter, the opposite plan is found in the water-tube boiler. The water is in the tubes and in one, two, or three small cylinders or drums, and the fire is outside. The result is great saving in weight, higher pressures,

greater power, and quicker raising of steam. In the destroyers about a dozen types were tried, chief of which were those of Thornycroft and Yarrow, but for large ships the Belleville was adopted. These boilers needed more care in construction and skill in use, and for some years much trouble was experienced. Eventually this type gave place to the simpler and better Yarrow and Babcock-and-Wilcox types.

The first battleships to receive the Belleville were the *Canopus, Ocean, Goliath, Albion, Glory,* and *Vengeance,* comparatively small ships of 12,950 tons, 18·5 knots speed, and the same armament as the *Majestic,* but only 6-inch side armour. They did most of their service abroad, for which their light draught suited them. The first cruisers similarly fitted were the *Powerful* and *Terrible* in 1896. They succeeded the *Blenheim,* and were regarded as mammoths, with their 14,250 tons displacement, 538 feet length, 25,000 horse-power, and 22 knots speed. They were armed with two 9·2-inch guns and twelve (later sixteen) 6-inch guns and lighter weapons. Except on the gun casemates they carried no side armour, but a thick 6-inch deck over the vitals. They were unreliable ships of formidable aspect, with their high freeboard and four funnels. In 1897 to 1900 there followed two quartettes of ships, *Andromeda, Europa, Diadem, Niobe,* and then *Argonaut, Ariadne, Amphitrite,* and *Spartiate,* of 11,000 tons, 16,000 to 18,000 horse-power, about 20·5 knots speed, and sixteen 6-inch and some lighter guns. They also were bad steamers, slow, weakly armed, and a large target.

Submarines.—We must here step aside to record

the adoption by the Admiralty of submarines, which were for long regarded as toys by some competent observers, and whose functions are described later. Up to the end of the nineteenth century we had been content to watch private individuals and foreign nations make experiments, which went on for many years. There was one striking success in the American Civil War, when a Confederate submarine blew up the Federal frigate *Housatonic* and perished with her. Garrett (an English clergyman), Nordenfeldt (a Swede), and several French inventors tried their hand, but it was only when electricity became available for submerged propulsion that real success came. Nordenfeldt and the French achieved much progress in the eighties and nineties, but the most practical design was that of an American, J. P. Holland, and in 1900 five boats of his type were ordered by the British Admiralty.

The aloofness of the British authorities till that date was partly on account of the belief that the submarine at the best was only a weapon for the weaker Power, not for one whose frontiers were the enemy's coasts. The new boats were 63 feet long, 11 feet 9 inches beam, circular in cross section, and in general shape like a fat cigar. They displaced 120 tons submerged, and had two engines, one of 160 horse-power, driven by gasoline for use on the surface, when a speed of 10 knots was reached, and another of 70 horse-power for submerged running, driven by electricity, and giving 7 knots speed. The electric batteries could be recharged on the surface by the gasoline engine. One torpedo-tube was carried and five

torpedoes, and as each was fired water was admitted to make up the loss of weight. Submersion was effected first by admitting water to the tanks, and then by using the horizontal rudders for diving. The greatest care had to be taken to avoid diving below 100 feet, owing to the danger of the water-pressure crushing the hull. Tanks of air highly compressed supplied the crew of seven men, and in addition special apparatus was installed to purify air which had become vitiated. These first five boats were called the "A" class. "B" and "C" classes followed in 1905 to 1907. These were larger boats of 313 tons, with engines of 600 horse-power, and a surface and submerged speed of 13 and 9 knots respectively, embodying improvements in every direction. It was now realized that the submarine was a weapon which the stronger Power must develop as well as the weaker.

The "Canopus" battleships were followed by eight ships differing slightly from each other, the *Formidable, Implacable, Irresistible, London, Venerable, Bulwark, Queen,* and *Prince of Wales.* These were fine, strong ships of 15,000 tons, 16,000 horse-power, 18 knots speed, completed in 1901 to 1904. They had the same armament as the *Majestic,* but of later models, and 9-inch side armour and 12 inches on the heavy gun positions, with four torpedo-tubes. The *Duncan, Cornwallis, Exmouth, Montagu, Russell,* and *Albemarle,* of 14,000 tons, 18,000 horse-power, 19 knots, and only 7 inches of side armour, followed next. Again there was no departure from the traditional four 12-inch and twelve 6-inch gun armament of the *Majestic,* though the new model of each gun

showed an advance on its predecessor. In large cruisers a return was made in 1901 to the "armoured" type from that called "protected"—*i.e.*, with nothing more than an armoured deck. About the merits of this there was always much debate, but we could not afford to fall behind other nations. Six armoured ships, *Cressy, Aboukir, Sutlej, Hogue, Bacchante,* and *Euryalus,* were built. They were far better ships than the "Andromedas," being of 12,000 tons displacement, with engines of 21,000 i.h.p., 21 knots speed, and armed with two 9·2-inch guns, twelve 6-inch, and smaller pieces. They were well protected with a belt 6 inches thick. Belleville boiler trials were by now largely overcome, and these ships steamed well.

In second-class cruisers the next after the *Astrea* were the "Eclipse" class of nine ships of 5,600 tons, 9,600 horse-power, 19·5 knots speed, with eleven 6-inch and smaller guns, a protective deck of 1½ to 3 inches thickness, and three torpedo-tubes. The *Hermes, Hyacinth,* and *Highflyer,* similar ships but with the new Belleville boilers and somewhat higher speed, followed. There were also four of a special type, about the same size, but shorter, broader, and designed to act also as fleet rams, for which their handiness and strong construction fitted them. These were the *Arrogant, Furious, Gladiator* (which came to an untimely end in collision), and the *Vindictive,* famous during the Great War for her exploit at Zeebrugge on St. George's Day. The *Challenger* and *Encounter* showed the same general characteristics as the *Hermes.*

Contemporary third cruisers were not a great success, the *Pelorus* and her sisters of the "P" class, of

2,135 tons, 20 knots, and eight 4-inch guns, proving poor steamers at the best.

With destroyers great progress was made. It was a type which was still too new to have become stereotyped, and British superiority in it was well marked. In the *Albatross,* already mentioned, the limit of speed with the reciprocating engine seemed to be reached. With these engines heavy masses of metal had to be started and brought to rest twice with each revolution, and the rate of revolution had become so terrific—over 400 to the minute—that breakdowns were bound to be frequent. Just at the right time the Hon. Charles Parsons, after long experiment, produced the midget *Turbinia,* which, fitted with his turbine engine, astonished the world with her speed of over 30 knots at the Naval Review of 1897. The turbine may be likened to a very highly developed windmill, accurately adjusted blades being rotated by steam in a drum surrounding the propeller shaft as a windmill's sails are in open air. The simple revolution and the absence of reciprocating parts made very high speeds possible. The British Admiralty quickly grasped the significance of the new engine, and in 1899 to 1900 two remarkable destroyers appeared containing it. They were the *Viper* and *Cobra,* the former of about the same size as other destroyers, 312 tons, and the latter 400 tons. The armament was the usual one 12-pounder and five 6-pounder guns with two torpedo-tubes, but their turbine engines gave them 10,000 horse-power each instead of a maximum of 8,000, hardly obtained, in the *Albatross,* and the speed exceeded 36 knots. Though both did so well on trial,

they came to a tragic end, *Viper* being wrecked during manœuvres and *Cobra* going down with all hands on her way from the builders, thus strengthening the seaman's prejudice against "snake" names. Other turbine destroyers followed, but the large "River" class, such as the *Rother,* kept to the old engine. The size was increased to 600 tons, a forecastle was added to make them more seaworthy, and the construction was stout, but the speed was very low, only 25 knots. It was quickly found that a slow destroyer was not much better than a slow racehorse, so the next move was to the "Ocean" or "Tribal" class, exemplified by Thornycroft's *Tartar,* which was of 860 tons displacement, with five 12-pounder or two 4-inch guns, and turbine engines of 14,500 horse-power giving no less than 33 knots speed, and in most cases more. These were fine boats, well able to keep the sea and hunt down other "mosquito" craft. Though torpedo-boats were still built they were a dying race. The "Tribal" class were arranged to burn oil, after long and noisome experiments had been made with the *Surly,* which for many months assailed the atmosphere of Portsmouth with dense clouds of smoke. Oil had great advantages over coal, being easy to load, convenient to stow, and very clean to use after the first tendency to produce smoke had been overcome. It also needed fewer men in the stokehold.

After these boats there was another swing of the pendulum towards lower speeds, and a great number of destroyers followed of from 750 to 940 tons, mostly of 27 knots speed and only a few of 32 knots, with many small differences in detail. A year or two

before the war it was decided to aim at greater uniformity not only in design but in names, and the "L" class, such as *Laforey,* of 965 tons, 24,500 horse-power, an easy 29 knots speed, and three 4-inch guns, formed a very useful and homogeneous type. Again the pendulum swung, the "M" class, such as the *Matchless,* having a displacement of 880 to 1,400 tons, horse-power up to 25,000, a speed of 34 to 35 knots, and four torpedo-tubes, with three 4-inch guns and one 12-pounder. These were commissioned soon after war broke out, and saw a great deal of service. During the war nearly 300 destroyers were built, with names ranging through the alphabet from L to Z, all within the limits of the "M" class, with similar armament and a nominal speed of generally 36 knots, which many exceeded. Large though the number was, it was not one too many, as no class of ship had harder or more varied work to do than the destroyers, the duties including work with the battle fleet, patrolling, fighting enemy destroyers, hunting submarines, and convoying merchantmen. It was, indeed, chiefly the scarcity of destroyers which made the obvious convoy system so difficult to adopt.

We have now run rather far ahead with destroyers, and must take up the story of the larger ships.

In 1904 two small battleships, *Triumph* and *Swiftsure,* were purchased from Chile, their names being changed from *Libertad* and *Constitucion.* They were of only 11,800 tons, but had a speed of nearly 20 knots, and mounted four 10-inch and fourteen 7·5-inch guns. They were, however, too lightly built and thinly armoured to be ideal for the British service,

and they spent nearly all their time on foreign stations.

Among cruisers the "Cressy" class was outshone in 1903 by the mighty *Drake, Good Hope, King Alfred,* and *Leviathan,* of 14,100 tons, 30,000 horse-power, and nominally 23 knots speed—actually 25 knots was reached by all. Their sides were protected by an extensive belt, 6 inches thick, of Krupp steel armour, and they mounted two 9·2-inch guns, with sixteen 6-inch and the usual smaller weapons. They were splendid steamers and very good value for their size. At the same time ten smaller ships, the *Essex, Kent, Cumberland, Cornwall, Berwick, Bedford, Suffolk, Monmouth, Lancaster,* and *Donegal*, were built. These were of 9,800 tons, 22,000 horse-power, and 23 knots speed; but they were weakly armed with fourteen 6-inch guns, and weakly armoured with nothing more than 4 inches of Krupp steel on the side and 5 inches on the bulkheads and gun positions. They were, however, fast ships, and did good work in the war, except the *Bedford,* which was wrecked some years before. The *Kent* especially won distinction by a great feat of steaming at the Battle of the Falklands.

Ever since the "Royal Sovereign" class the design of large ships had been slow, steady, but on the whole sound, with little originality except in the engines, where the water-tube boiler had been adopted. A great change was now coming.

Until the *Scylla,* under Captain Percy Scott, showed what new methods of gunnery training could do, it seemed to be the accepted intention to close the enemy till missing was hardly possible, when the big guns would attack armoured portions and the secondary

battery smash the unprotected parts of the enemy ships. People now began to reflect that if new methods could insure hitting at longer ranges the big gun might settle matters before the secondary guns came into action, and the further consideration was being forced on naval minds that the growing accuracy and power of the torpedo would profoundly affect the range at which fleet actions would be fought. The moral was to mount more heavy guns and begin to hit as soon as possible. The first example of the new theory was the class of battleships finished in 1905, the *King Edward VII., Britannia, Hibernia, Africa, Hindustan, Commonwealth, Dominion,* and *New Zealand,* afterwards called *Zealandia.* These fine ships carried, besides four 12-inch guns of the latest pattern, four 9·2-inch guns mounted at the four corners of the superstructure, with ten 6-inch guns and smaller pieces as secondary battery. Their tonnage was 16,350, horse-power 18,000, and speed 18½ knots. They were protected with side armour of 9 inches, and 12 inches on the heavy gun positions. The extra 9·2-inch guns were a powerful reinforcement, but the lesson was clearly only half learned, and the theory was carried a stage further in the *Lord Nelson* and *Agamemnon,* begun in 1904, and designed by Sir Philip Watts. These ships had the usual four 12-inch guns, but ten 9·2-inch guns instead of the *King Edward's* four, and the 6-inch gun battery was suppressed altogether, the rest being twenty-four 12-pounder guns for defence against torpedo craft. The side armour was increased to 12 to 8 inches, with 6 to 4 inches at bow and stern and 12 to 6 inches on

William Nicholson.

ADMIRAL-OF-THE-FLEET LORD FISHER. O.M. G.C.B. G.C.V.O.

FIRST SEA LORD 1904-10. 1914-15. A GREAT REFORMER.

BY KIND PERMISSION OF THE ARTIST.

facing p. 104.

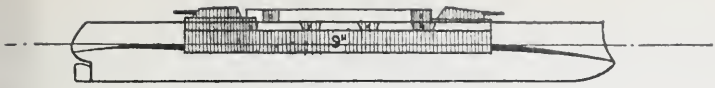
the heavy gun positions. Four torpedo-tubes were fitted. Their tonnage was 16,500, horse-power 16,750 and speed about 19 knots on trial. Still the lesson was not completely absorbed, and before they had got very far in building the active mind of Admiral Fisher had leaped the rest of the way.

The completely successful application of the turbine engine to torpedo craft had led to experiments in the third-class cruiser *Amethyst* in competition with her sisters *Sapphire, Topaz,* and *Diamond.* All were of 3,000 tons, and had an armament of twelve 4-inch guns. The last three were given the old reciprocating engine, and on trial they developed 10,000 horse-power and 22½ knots; but the *Amethyst* with turbines developed 14,000 horse-power and attained 23½ knots, and, moreover, proved herself more economical than her sisters at all but low speeds. This prepared the way for a great venture.

Admiral Fisher's plan was to build in complete secrecy and with unheard-of rapidity a novel ship which was destined to give her name to all future classes of battleships for the next fifteen years. This ship was the *Dreadnought,* which at a stroke rendered obsolete every battleship in our own or any other navy. She was of the unprecedented displacement of 17,900 tons, she was given the new turbine engine developing no less than 27,500 horse-power, and the speed aimed at was the very high one of 21 knots, which was exceeded on trial by one knot. The greatest change, perhaps, was in the armament, which consisted of ten 12-inch guns. The advantage of this was not only in the smashing power obtained, but its

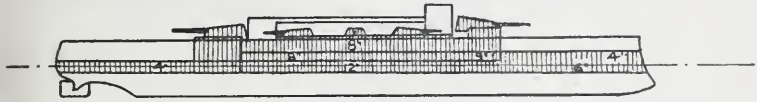
very simplicity enabled Captain Percy Scott's new method of fire direction and "spotting" to be fully utilized. These guns were disposed in five turrets, one forward, one on each beam, able to fire both ahead and astern, one aft, and one on the centre line nearly amidships, able to fire on either broadside. A complete belt of armour varying from 11 inches to 4 inches, and the usual protective deck $1\frac{3}{4}$ to $2\frac{3}{4}$ inches thick, were provided. The ram-bow was abolished. For anti-torpedo armament she relied on twenty-four 12-pounder guns, and no fewer than five torpedo-tubes were fitted. The traditional position of the officers' quarters, aft, was abandoned, but was restored in later ships. The revolutionary character of the *Dreadnought's* design and the amazing rapidity of her construction (she was running trials one year after being laid down) took all foreign Powers by surprise, and nowhere was her advent less popular than in Germany, as it meant not only a hurried following of her example two years behind, but also the expensive enlargement of the Kiel Canal.

In armoured cruisers the same process of reasoning had been going on. After the *Drake* came the *Duke of Edinburgh* and *Black Prince,* of 13,550 tons, 23,500 horse-power, and 22½ knots speed in 1906. As in the battleships, their heavy guns were increased in number, these two ships carrying six 9·2-inch guns instead of two, disposed one forward, one aft, and two singly on each side at the corners of the superstructure. Amidships were ten 6-inch guns, with two 12-pounders and twenty-eight 3-pounders. Thus three heavy guns could fire ahead or astern and four on

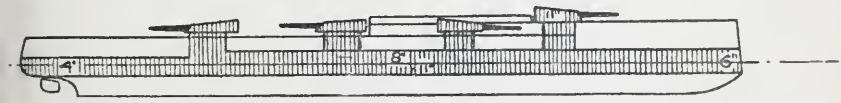


MAJESTIC. 1895. HOODED BARBETTES.

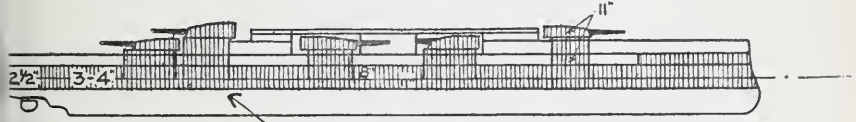
KING EDWARD VII. 1905 COMPLETE BELT. AUXILIARY HEAVY GUNS.



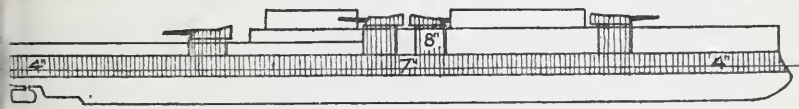
AGAMEMNON. 1908. MORE AUXILIARY HEAVY GUNS.
SECONDARY GUNS DISAPPEAR.



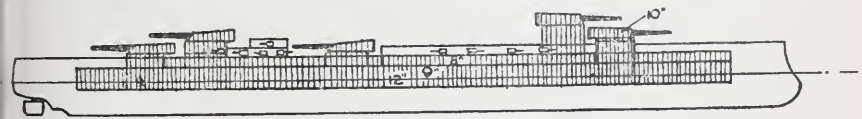
DREADNOUGHT 1905. FIRST ALL-BIG-GUN BATTLESHIP. TEN 12-INCH GUNS.



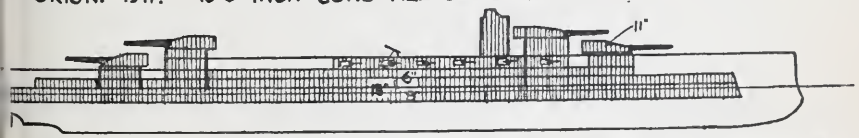
NEPTUNE. 1911. SUPERPOSED TURRET. CENTRE TURRETS EN ECHELON.



NVINCIBLE. 1908. FIRST BATTLE-CRUISER. EIGHT 12-INCH GUNS.



ORION. 1911. 13·5-INCH GUNS ALL ON CENTRE LINE.



ELIZABETH. 1915. FAST BATTLESHIP. 15-INCH GUNS. 6-INCH GUNS REAPPEAR.

Representative Battleships—II.

each broadside. The sides, bulkheads, and heavy gun positions were protected by 6-inch armour, tapering to 3 inches, with a 1-inch belt, and three torpedo-tubes were fitted. Simultaneously the smaller *Antrim, Argyll, Carnarvon, Devonshire, Hampshire,* and *Roxburgh,* of 10,850 tons, 21,000 horse-power, and 22 to 23 knots speed, were built. These carried two pairs of 7·5-inch guns, six 6-inch, and twenty 3-pounders, with side armour of 6 to 2 inches, 4½-inch bulkheads, and 2 to ¾ inch decks. This class was remarkable for the fact that four different types of boiler were tried, the Dürr, Niclausse, Yarrow, and Babcock and Wilcox, the last two being destined to oust all others from the British Navy. Then came the *Achilles, Cochrane, Natal,* and *Warrior,* like the *Duke of Edinburgh* in other respects, but with four 7·5-inch guns instead of ten 6-inch. In 1908-1909 three more followed, the *Defence, Minotaur,* and *Shannon,* of 14,600 tons, 27,000 horse-power, and 22½ knots speed. They carried four 9·2-inch guns, ten 7·5-inch, and sixteen 12-pounders, with 6 to 4 inches of side armour, 6-inch bulkheads, and 8 and 7 inches on the gun positions. Thus, as with the battleships, the time had come for the last stride to the logical conclusion. Again a great leap was made to a new type called the "battle-cruiser," which, as the name implies, was a mixture of the battleship and armoured cruiser, some of the heavy guns and 25 per cent. of the armour being sacrificed to engine power and fuel capacity. The first battle-cruisers were the *Invincible, Inflexible,* and *Indomitable,* completed in 1908-1909. These monsters were of 17,250 tons, 41,000 horse-power, and

25 knots speed, and they carried eight 12-inch guns in four turrets, one forward, one aft, and two in echelon amidships, with sixteen 4-inch guns to repel torpedo attack, and five torpedo-tubes. They had side armour of 7 to 3 inches, with 7 inches on the gun positions. It is said that Admiral Fisher had sham plans of these ships left about at the Admiralty, knowing that the Germans would find out about them, with the result that the Germans built the *Blücher,* a close copy of the sham ships and vastly inferior to the real ones! The battle-cruiser type was much criticized, as all innovations are, but it justified itself and proved able at a pinch to reinforce the battle line, its weak point being the protection of the magazines, a defect that was to be painfully evident at Jutland.

Harking back to smaller craft again, an attempt was made in 1905 to provide a satisfactory scout cruiser in the *Attentive, Adventure, Forward, Foresight, Pathfinder, Patrol, Sentinel,* and *Skirmisher.* These were of 2,670 to 2,940 tons, with engines of 14,000 to 17,000 horse-power, with a speed of 25 knots, and nine 4-inch guns. Better ships were the *Active, Amphion, Bellona, Blanche, Blonde, Boadicea,* and *Fearless,* built about 1910, of 3,440 tons, 18,000 horse-power, 25 to 26 knots, and ten 4-inch and smaller guns. Bigger and longer and with turbine engines, they were better able to keep their speed.

Triumphant as the *Dreadnought* was both as steamer and fighting machine, improvements were at once devised for her successors. The range of the torpedo was increasing so fast that a larger gun than the 12-pounder had to be mounted in order to hit

torpedo craft at the range at which torpedoes could be fired. The next battleships, therefore, *Bellerophon, Superb,* and *Téméraire,* had sixteen 4-inch guns instead of the 12-pounders, and the torpedo-tubes were reduced from five to three. Their tonnage rose to 18,600, and they carried two large tripod masts instead of one large and one small one, but otherwise they were like the *Dreadnought. St. Vincent, Vanguard,* and *Collingwood,* of 19,250 tons, followed in 1910 with two more 4-inch guns, but otherwise similar. In 1911 came *Neptune,* of 19,900 tons, and then *Colossus* and *Hercules,* of 20,000, with one mast and two respectively. These ships were of a new type. The horse-power rose to about 25,000 and their speed still 21 knots, with protection like that of their seven predecessors, but their ten 12-inch guns were mounted differently. One pair was in a high turret forward, two lower turrets were amidships in echelon, so that, theoretically at least, both could fire ahead, astern, and on either broadside, and the fourth was raised aft on the centre line so that it could fire over the fifth when trained astern. This system of superimposed turrets had been tried in other navies but not in our own, and it is significant that they were the only British ships in which astern fire was greater than ahead. It is equally noteworthy that in the German navy, whenever ahead and astern fire was not equal, astern fire was always the greater, thus showing the way in which they were likely to fight.

After this period of slow and steady progress came another bold step. The next batch of battleships, *Orion, Conqueror, Monarch,* and *Thunderer,* com-

pleted in 1912, displaced 22,500 tons, and reached the standard speed of 21 knots with 28,000 horse-power. The great change was in the guns, of which there were ten of 13·5-inch calibre, firing a projectile of 1,250 lbs.—nearly half as heavy again as the 12-inch gun shell, and they were mounted in five turrets, all on the centre line, the second and fourth being raised to fire over the first and fifth. The rest of the armament was the same as before, but the side armour was increased to 12 and 9 inches thickness, and that on the heavy gun positions was 10 inches thick. After these came the *King George V., Ajax, Audacious,* and *Centurion,* of 23,000 tons, the same speed and armour, but with 13·5-inch guns of a new pattern firing a 1,400-lb. shell, disposed as in *Orion*. The next class, *Iron Duke, Marlborough, Emperor of India,* and *Benbow,* completed in 1914, showed a further recognition of the growing power of the torpedo, and, for the first time, the existence of hostile aircraft. Displacement rose to 25,000 tons and power to 30,000, which gave a speed of 22 knots, and the armour varied from 12 inches to 4 inches on the side, with 11 inches on the heavy gun positions. Four torpedo-tubes were fitted instead of the customary three. The main armament was the same as in the *King George V.*, but against torpedo craft the 6-inch gun made its reappearance to the number of twelve. It was clear that with a range of about 15,000 yards the torpedo, or rather the craft that carried it, had to be kept at a distance by something heavier than the 4-inch gun. Against the new pest, aircraft, two 3-inch anti-aircraft guns were provided.

The three first battle-cruisers were followed by the *Indefatigable, New Zealand* (presented by the people of New Zealand), and *Australia,* of the Australian Navy. These were of 18,750 tons, and slightly greater power and speed than the *Invincible,* and with rather more space between the echelon turrets amidships, but in other respects they were similar. Following them came the *Lion* and *Princess Royal,* of 26,350 tons, 75,000 horse-power, and more than 28 knots speed. These superb ships, completed in 1912, carried eight 13·5-inch guns, all on the centre line, with the second turret raised to fire over the first, the third amidships, and the fourth right aft. A nearly complete belt of armour 9 to 5 inches thick protected the sides and heavy gun positions. Sixteen 4-inch guns and only two torpedo-tubes were carried. By this time the abolition of the torpedo-net was decided on, as, in spite of its great weight (it was made of stout steel rings), it was unable to keep out the modern torpedo, which was fitted with apparatus to cut its way through. The *Queen Mary,* which followed, was somewhat larger but otherwise identical with the *Lion.* In 1914, after the outbreak of war, came the *Tiger,* of 28,000 tons, 108,000 horse-power, and 30 knots speed. She, like the *Iron Duke,* carried twelve 6-inch guns against torpedo craft and four anti-aircraft guns, but otherwise she was armed like the *Lion,* the chief difference being that the third turret was raised to fire over the fourth.

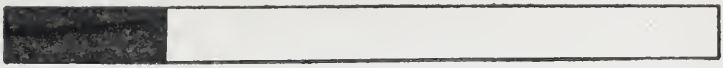
In submarine construction notable progress had been made when war broke out, and at first we were far ahead of the Germans. The "D" class were of

604 tons and 14 knots surface speed, with three torpedo-tubes. After them in 1911-13 came the famous "E" class, many of which were to make an immortal name for themselves in the Dardanelles and the Baltic by deeds of daring unsurpassed in the history of war. These craft were of 800 tons, 1,600 horse-power, and 15 knots surface speed, the submerged speed remaining throughout at about 10 knots, as high speed was less important when out of sight than when visible. A single 3-inch gun was mounted, which was found very useful in the Dardanelles, and five 18-inch torpedo-tubes were fitted. The "F," "G," and "H" classes call for no special description, but in the "J" class the size rose to 1,820 tons, the speed to 19 knots, and the number of torpedo-tubes to six, thus showing the same tendencies in design as all other classes. In the "K" class an attempt was made to provide submarines capable of operating with the fleet, so tonnage rose once more to 2,650, length to 338 feet, speed to 24 knots, and complement to 200 men. With one 4-inch gun, one 3-inch anti-aircraft gun, and eight 18-inch torpedo-tubes, the "K" class were formidable craft; but a good deal of doubt exists as to the advantage of submarines actually accompanying a fleet, as in the scuffle of high speed action at night or in thick weather submarines and big ships might be equally uncomfortable companions for each other.

When war came two new classes of heavy ship were being built, five being of a new type, a mixture of battleship and battle-cruiser, designed to form a fast division in a fleet action. These were the *Queen Elizabeth, Barham, Warspite, Valiant,* and *Malaya,*

the last being a very handsome present from the Malay States. Their displacement was 27,500 tons, and their engines of 75,000 horse-power, driven by oil instead of coal, gave them a speed of 25 knots. Eight prodigious guns of 15-inch calibre were mounted in four turrets, two forward and two aft, the second and third pair firing over the first and fourth. An almost complete belt of 13 to 6 inch armour made them equal to battleships, and their twelve 6-inch and two 3-inch high-angle guns made them a match for torpedo and aircraft respectively. The other class consisted of *Revenge, Ramillies, Resolution, Royal Sovereign,* and *Royal Oak,* battleships pure and simple, of 25,750 tons, 40,000 horse-power, and 23 knots speed. At first designed to burn coal, they were afterwards altered for oil, and their speed accordingly increased to that given above. Their armament and armour were similar to those of the *Queen Elizabeth,* except that the belt was carried right up to the bow.

Among the smaller ships, no "armoured cruisers" were built after the *Minotaur,* but a swarm of "light cruisers" as the second and third class came to be called, were built. The "Blondes" were followed by the *Bristol, Glasgow, Gloucester, Liverpool,* and *Newcastle,* of 4,800 tons, 24,000 horse-power, and 26 knots speed, with two 6-inch and ten 4-inch guns and two torpedo-tubes; then the *Falmouth, Yarmouth, Weymouth,* and *Dartmouth,* of 5,250 tons, 22,000 horse-power, 25½ knots speed, eight 6-inch guns and two torpedo-tubes. After these came in 1913 the *Birmingham, Chatham, Dublin, Lowestoft, Nottingham,* and *Southampton,* of 5,440 tons, but otherwise almost



Warrior 9,210 tons — *Hood* 42,100 tons

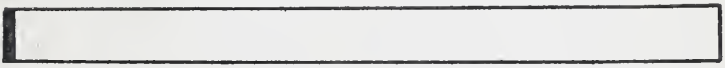
CAPITAL SHIP TONNAGE.

Warrior 5,270 — *Hood* 144,000

HORSE-POWER.

Warrior 14½ knots — *Hood* 32 knots

SPEED.



Warrior 1,400 — *Nelson* 94,000

HEAVY GUNS.
(Muzzle energy in foot-tons.)

First "Whitehead" 600 yds. — 21-inch 15,000 yds.

RANGE OF TORPEDOES.

PROGRESS IN THE STEAM AGE

identical. Just before the war a reversion was made to a smaller size, and the *Aurora* and her seven sisters of 3,750 tons, 30,000 horse-power, the high speed of 29 knots, side armour 3 inches thick, eight torpedo-tubes, two 6-inch and eight 4-inch guns, were rapidly completed, just in time to take a glorious part at the very beginning, followed by the eight "Calliopes" of 3,800 tons, 40,000 horse-power, similar speed and armament, but only four torpedo-tubes. The *Dragon* and ten sisters of 4,650 tons, similar in some respects, but with six 6-inch guns and no fewer than twelve torpedo-tubes, and the "Coventry" class, somewhat smaller, gave us a swarm of small and efficient ships well able to scout and hunt down enemy small craft.

Soon after war broke out it became evident that the important thing was to complete quickly the "capital" or heavy ships in hand for some months, and to lay down no more for the battle line. Two which had only just been started, and which were intended to be "Revenges," were altered to extremely fast battle-cruisers, able to run down and destroy any raider which might elude the patrols of the Grand Fleet. These were the *Renown* and *Repulse,* and their displacement was 26,500, their horse-power 112,000, and they were able to steam at the unprecedented speed (for large ships) of 32 knots. To get this great speed and provide adequate fuel capacity economies had to be made in other directions. Only six 15-inch guns were carried, with seventeen 4-inch, only two torpedo-tubes, and the side armour was small in area and of only 6 to 1½ inches thickness, with 11 to 7 inches on the heavy gun positions. So little

were they liked when they joined the Grand Fleet, on account of their weak protection, that substantial additions were made to the armour.

Just before war broke out there were several ships under construction for foreign Powers in British yards, while Germany, luckily enough for us, had almost nothing. The *Osman I.,* designed for Brazil but acquired by Turkey in 1914, was just about to leave for that country when orders were given to detain her before her crew took charge. She was requisitioned and renamed *Agincourt.* She was of 27,500 tons, 34,000 horse-power, and 22 knots speed. Her armament was unusual, fourteen 12-inch guns in seven centre-line turrets, with twenty 6-inch quick-firers and two torpedo-tubes. She was weakly protected with side armour from 9 to 3 inches thick, and with 12 inches on the heavy gun positions. The gunnery officers liked her armament, but in other respects, such as fuel capacity, she was inferior to our own ships. Another Turkish ship, the *Reshadieh,* was also taken over and named *Erin.* She was of 23,000 tons, 26,500 horse-power, and 21 knots, and carried ten 13·5-inch guns and sixteen 6-inch, with four torpedo-tubes. She carried thicker armour than the *Agincourt,* her side armour varying from 12 to 4 inches, with 11 inches on the heavy gun positions. A third battleship, completing for Chile, *Almirante Latorre,* was renamed *Canada.* She was larger than the other two, being of 28,000 tons, 37,000 horse-power, and nearly 23 knots. She had ten 14-inch guns and fourteen 6-inch, with four torpedo-tubes. Like the *Agincourt,* her protection was somewhat weak, with side

armour of 9 to 4 inches and only 10 inches on the heavy gun positions. Her sister, the *Almirante Cochrane,* was left unfinished till 1918, when she was turned into an aircraft carrier under the name of *Eagle*. These were all welcome reinforcements.

Mention must here be made of the system of "bulges," which were additional tanks fixed to the sides of ships below water to take the explosion when a torpedo found its mark. It was first tried on some of the old cruisers of the "Edgar" class, and proved to be a most useful protection against torpedoes, involving little loss of speed when properly shaped. It was afterwards applied to the "Queen Elizabeth," "Revenge," "Repulse," and other classes, and increased the displacements of those ships above the figures just given.

While he occupied the position of First Sea Lord during the war Lord Fisher gave an immense impulse to new construction, but though at this distance of time it seems clear that some of his ideas were unsound, on the whole the country owes a very great deal to his energy and imagination. In pursuit of his favourite scheme for landing troops on the Baltic coast of Germany, 100 miles from Berlin, and for the general purposes of the Navy, no fewer than 590 craft, from battleships to motor launches, were put in hand by him. Perhaps the least satisfactory were three large light cruisers, in which Lord Fisher's theory that "speed is armour" was carried too far. These were the *Glorious, Courageous,* and *Furious*. The first two were of 18,600 tons, 90,000 horse-power, and 32 knots speed, very light draught to enable them

Photo: Cribb, Southsea.

H.M.S. COURAGEOUS.

AIR-CRAFT CARRIER. 22,500 TONS. 90,000 HORSEPOWER. 31 KNOTS.

(NOTE THE "BULGE" ON THE WATER-LINE.)

facing p. 118.

to work in shallow water, and no side armour thicker than 3 inches, with only 7 inches on the big gun positions. They mounted four 15-inch guns in two turrets and eighteen 4-inch, with no less than fourteen torpedo-tubes. *Furious* was similar in some ways, but displaced 19,100 tons, and was designed to carry two enormous 18-inch guns, one forward and one aft, with eighteen torpedo-tubes and ten 5·5-inch guns against torpedo craft. All three proved exceedingly fast steamers, but they were too lightly constructed, and all were eventually converted, at vast expense, to serve as aircraft carriers, a service which they perform very successfully. The *Glorious* carries twenty-four aeroplanes—*i.e.,* two flights each of "fighters," "spotter-reconnaissance" machines, and torpedo-dropping planes. Her 4·7-inch anti-aircraft guns are the most efficient in the world.

The different craft demanded by war operations were almost innumerable. From the very first mine-sweeping and patrol work had to be constantly and efficiently done, and for these purposes trawlers, Channel and pleasure steamers and private yachts were taken over in large numbers. As experience was gained, special types were designed and built. One of the most important was the "P" boat, of 573 tons, 22 knots speed, and the very shallow draught of 7 feet 7 inches, to make them as safe as possible against torpedoes and mines. With two torpedoes, one 4-inch and one 2-pounder gun, and a special ram, they were well able to relieve the more expensive destroyer in much of the submarine hunting and patrol work.

Another class of ship, long abandoned in the Navy and not expected to be required, was the "Monitor," which in old days had been built for coast defence till the sound doctrine that our frontiers were the enemy's coasts was grasped. In the Great War our command of the surface of the North Sea was complete enough for monitors to be needed for operations off the enemy's coasts in shallow waters. Three, completing for Brazil, were taken over at once and named *Humber, Mersey,* and *Severn,* and they did good work off the coast of Africa and elsewhere; but they were only of 1,260 tons, and something better was wanted. Several types were built, but the most notable were the *Erebus* and *Terror,* of 8,000 tons and 6,000 horse-power. With a length of 405 feet and a beam of 88 feet, they were bound to be slow and unhandy; but they managed 14 knots, and their light draught of 11 feet and wide bulges made them almost invulnerable to mines and torpedoes. They carried two 15-inch guns in a very high turret, and did most useful work off the Belgian coast by accurate fire at long range. If our command of the sea had been more vigorously disputed they would have been almost useless, but the grim spectre of the Grand Fleet discouraged prolonged cruises by the High Seas Fleet. The *Erebus* was on one occasion hit by a distance-controlled boat from the shore carrying a very large charge of high explosive, but her bulge saved her, and the damage was repaired in less than a fortnight. Other monitors did well in the Dardanelles and elsewhere, and no bulged ship was ever sunk by a torpedo.

Taking up again the story of the submarine, by June, 1916, we find E 41 adapted for laying mines in German waters, and that, following Admiral Jellicoe's advice, other boats were fitted with more powerful wireless apparatus with a range of 300 to 400 miles, so that they could give early news of movements in the German fleet. Following the "K" class came the "L" class, of 1,090 tons and 17 knots, which, though smaller and slower than the "K's," carried four 21-inch torpedo-tubes in the bows and two 18-inch on the broadside. An experimental boat, M 1, was built to carry a short 12-inch gun in a turret, but she was not used, as it was considered inadvisable to put ideas into the German heads! We see therefore that the submarine, which began as a submerged torpedo-boat, developed into a craft able to sink small vessels by gunfire, to act as an advanced scout, to lay mines, and even to act as a monitor.

We now come to the post-war ships, which embody lessons learned on active service. What they would have been if unlimited by the cramping restrictions of the Washington Treaty we can only conjecture, but the advance made is still very striking.

First of all comes the enormous *Hood,* begun before all the lessons of Jutland could be applied, and still the largest warship in the world. The Germans tried to get her plans, but the attempt failed. She is a battle-cruiser, but very few battleships would care to engage her. Her displacement is no less than 42,100 tons, horse-power on trial 151,000, length 860 feet, beam 105 feet, and draught 32 feet 6 inches. Her trial speed reached 32 knots. She carries eight

15-inch guns in four turrets on the centre line, as in the *Queen Elizabeth,* with twelve 5·5-inch, four 4-inch anti-aircraft guns, four 3-pounders, five machine-guns, and ten lighter weapons. Four deck torpedo-tubes and two submerged are also provided. An almost complete belt of 12 to 6 inches, with 7 and 5 inches above it and 11 inches on the heavy gun positions, gives her very good protection, which is increased by the minute subdivision of the hull. She was completed in 1920 at a cost of £5,843,000. About the same time as the *Hood,* five cruisers, *Raleigh* (which was subsequently lost), *Hawkins, Frobisher, Effingham,* and *Vindictive,* were built. The last-named served as an aircraft carrier during the war, but was reconverted to cruiser, but with a catapult forward instead of one gun. These five are of 9,860 tons, 60,000 horse-power, and 30 knots speed, and they carry seven 7·5-inch guns with three 4-inch anti-aircraft and lighter pieces, and six torpedo-tubes. They have complete protection by armour 3 inches to 1½ inches thick, and are admirably adapted for commerce protection in the outer seas. The *Emerald* and *Enterprise,* of 7,100 tons, 80,000 horse-power, and 33 knots, with seven 6-inch guns and twelve torpedo-tubes, should be mentioned. A solitary mine-layer for distant work, named *Adventure,* was also built. On a displacement of 6,740 tons she is able to carry a very large number of mines (over 300), and with her speed of 27¾ knots she would be of the greatest value.

The ships affected by the Washington Treaty are those which were not started before the end of the war. The treaty provides that no cruiser shall be built larger

Photo: Cribb, Southsea.

H.M.S. SUSSEX.

CRUISER. 10,000 TONS. 80,000 HORSEPOWER. 32¼ KNOTS. EIGHT 8-INCH GUNS.

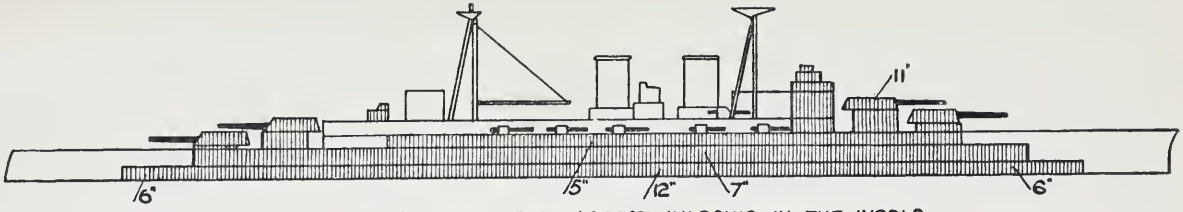
facing p. 122.

than 10,000 tons, carrying no gun larger than the 8-inch. It is very doubtful whether such a method of limitation is really practicable. Our 10,000 ships are named after counties, and the *Berwick, Cornwall, Cumberland, Devonshire, Dorsetshire, Kent, Suffolk, Norfolk, London, Shropshire,* and *Sussex* are already built. With a horse-power of 80,000 they steam at 32¼ knots, and they can carry oil enough for 10,000 miles steaming at economical speed. They are armed with eight 8-inch guns of a new pattern, four 4-inch anti-aircraft, four 3-pounders and lighter guns, with eight 21-inch torpedo-tubes. The British Navy contains two 8,400-ton cruisers, *Exeter* and *York,* with the same speed as the *Berwick,* and six, instead of eight, 8-inch guns. The Washington Treaty has had the effect of altering the displacement of the types of ships concerned, so that the *Queen Elizabeth* has become 31,000 tons, *Iron Duke* 26,500, *Renown* 32,000, and so on. In some cases the addition of a bulge has also increased displacement. This Washington Treaty rule lays down that the displacement of a ship means the whole ship, complete with crew and everything intended to be carried in war except fuel and reserve feed-water.

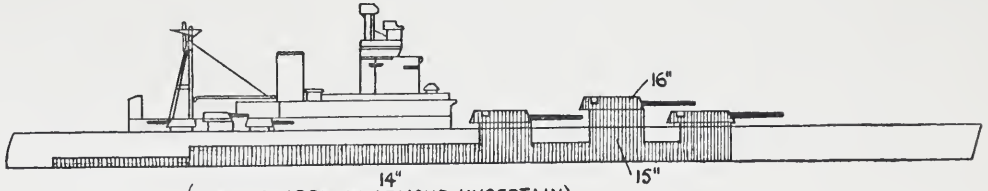
After the war the "M" class of submarines was succeeded by the "R" class, in which the usual relation of surface to submerged speed was reversed, the former being only 9½ knots and the latter 15. These were only small craft of 500 tons, and very few were built. The X 1, which followed in 1925, showed the same feature, but on a larger scale, the displacement being 3,600 submerged, which is as large as second-

class cruisers of the "Astrea" class. Full details of this boat, which was experimental, were not published. After X 1 submarines were held to have deserved the dignity of names instead of numbers, and the alphabetical system, as in destroyers, has been adopted. The first to receive this honour was the *Oberon* in 1927, which displaces 1,380 tons on the surface and 1,800 submerged, with a horse-power of 2,950 and 1,350 respectively. The old practice of high surface speed is resumed, and 15 knots above and 10 below water are attained. All seven boats carry eight torpedo-tubes as well as one 4-inch gun. The latest class are the "P" and "R" boats, represented by the *Phœnix,* but details of these are regarded as confidential beyond the displacement, which is 1,570 on the surface and 2,040 submerged.

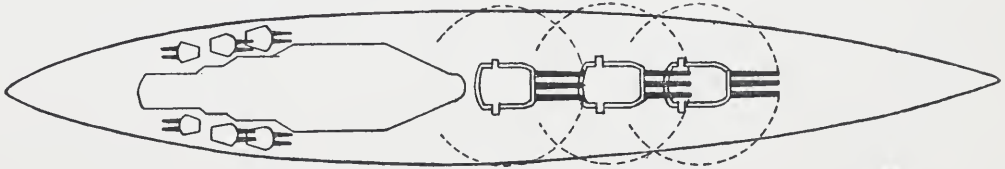
This account of the development of the modern navy may fitly close with a brief description of the two newest battleships, the only ships embodying all the lessons learned during the war. They bear the honoured names of *Nelson* and *Rodney,* and are without an equal in any other fleet. By the Washington Treaty their displacement was limited to 35,000 tons instead of the 48,000 at which designers were already aiming. The necessity, therefore, of utilising every device that human ingenuity could think of was more urgent than ever. These two wonder ships are 710 feet long, 106 broad, and draw 30 feet of water. With extraordinarily efficient engines of 45,000 horse-power, they steam easily at 23 knots on an oil-consumption of only 16 tons per hour against 23 tons in the *Revenge,* which is 6,000 tons smaller. The size



HOOD. 1920. BATTLE CRUISER. THE LARGEST WARSHIP IN THE WORLD.



(PRECISE AREA OF ARMOUR UNCERTAIN)



NELSON & RODNEY . 1927. ALL HEAVY GUNS FORWARD. TRIPLE TURRETS.

of the heavy guns is also limited by the Washington Treaty to 16-inch calibre, but of these they carry nine in three turrets instead of the usual eight heavy guns in four turrets. All three turrets are carried forward on the centre line, the middle one being raised to fire over either of the other two. The advantage of this arrangement is that fire-control, which, of course, is now carried out from one station, is facilitated, and a considerable saving of armour is effected. The disadvantage, and a serious one, is that though all nine guns can fire on either broadside, and six can fire straight ahead, 30 degrees towards the stern cannot be covered by any heavy gun, and 60 degrees can only be covered by three of the nine. It seems unlikely that this will be repeated in future designs. Besides this prodigious main armament, able to hurl nine tons of shell in one discharge to a distance of 20 miles, there are twelve 6-inch guns in six small turrets aft, one of each set of three on each side being arranged to fire over either of the other two, so that four guns can fire straight astern or ahead. There are in addition six 4·7-inch anti-aircraft guns and eight smaller. In order to keep the navigating and fighting positions clear of funnel smoke and fumes, the engines are forward of the boilers, and the single funnel is well aft. Still further aft is a single tripod mast, and nearly amidships, just behind the turrets, is a huge steel structure irreverently called "Queen Anne's Mansions," where the whole direction of the ship is centred. The greatest attention has been given to protection. There is no external bulge as a precaution against mines and torpedoes, but the hull is

so strong and so minutely subdivided that the ship would withstand hits by four or even more torpedoes. Above and on the water-line the armour is of unprecedented strength, the thickness on the side from the foremost 16-inch turret to the after 6-inch turret being 14 inches, while the turrets have a maximum of 16 inches, the barbettes below 15 inches, and the deck over the vitals is no less than 6¼ inches thick to keep out bombs. The total complement of officers and men is 1,400 when an Admiral's staff is carried. Only two torpedo-tubes are fitted, contrary to recent practice. Altogether these are superb fighting machines, the finest in the world, and so long as they were not forced by superior numbers to present their innocuous sterns to the enemy, a thing that has not happened to a British battleship for a long time, they would be sure to acquit themselves well.

And now what of the future? There has been a vast deal of talk, "about it and about," and the old cry that the battleship is doomed has often been raised, but so far there is no sign, in spite of aircraft and submarines, that the last word will not be, as it always has been, with the heavy ship. Cost alone (the *Nelson* cost £7,000,000) seems to deter the nations from building ships even bigger than these, and every navy still puts its faith in the large "capital" ship, whether she be 40,000 or 20,000 tons. Every device that is brought out, as we have seen, produces its own antidote, so that we always come back to the big ship.

CHAPTER VI

NAVAL WEAPONS

Guns.—Guns, which are, and seem likely to be for the present, the main weapon of navies and armies, are only a development of very ancient throwing weapons like the sling, the bow, and the catapult, and they owe their existence to the discovery of gunpowder as a propellant.

The first mention of them in sea warfare was in 1346, when Edward III. invaded France, and they were also used in the same century by the Moors and Venetians. At that time they were made of iron or brass, and fired shot of only two or three pounds weight, and some were made of lengths of iron bound together like faggots. They were, of course, very crude and inaccurate, but it is noteworthy that both breech-loaders and rifling, both abandoned and both eventually universal, were known very early in the gun's history.

By the time of Henry VII. guns were well established for sea fighting, and his two famous ships, *Sovereign* and *Regent,* carried as many as 180 pieces each, mostly very small. They were among the earliest ships to be fitted with port-holes for the guns, and it is obvious that considerations of weight and space made it impossible to carry either a large number of small guns or a small number of big ones on the top deck alone.

Henry VIII. built the even more celebrated *Henry-*

Grâce-à-Dieu, whose tonnage is stated to have been either 1,000 or 1,500. She carried, besides "handgonnes," 130 guns of various kinds, with picturesque names like "culverins," "sakers," "fawcons," "portpecys," "bæssys," etc., which would need more space for their description than we can spare for them here. Even with these clumsy weapons much thought was given to the science of gunnery in those early days by people like the Italian Tartaglia, Sir William Monson, and others, who studied guns, powder, projectiles, trajectories, and sights deeply. Most gun-carrying ships seem to have contained a large variety of different patterns till the practical seamen of Cromwell's time reduced both the number and the types used, substituting for the old names a system by which guns were classified according to the weight of shot fired—*e.g.,* 24, 18, 12, 9, and 6 pounders.

In the reign of Queen Anne the usual arrangement for the larger ships was to mount 32-pounders on the lower deck and 18 and 9 pounders on those above. For sea work cartridges of paper or canvas took the place of loose powder put in with a ladle, and improvements were made in the gun-carriages. Guns at that time and for many years to come were fired by means of a small quantity of loose powder poured into a touch-hole at the rear end and ignited by slow match. Mention must be made of the "carronades," first produced in 1776 by the famous foundry at Carron in Scotland, which, though lighter than the 12-pounder ordinary gun, fired 32-pound shot with fair accuracy up to 600 yards.

On the whole, it may be said that progress in gun

design was as slow as that of ships themselves up to about 1860, and an illustration of this is the fact that ashore some of the actual guns which were used at Waterloo were used again in the Crimea some forty years later! In these days not only the guns but the type of gun would be hopelessly obsolete and condemned in much less time.

It may be of interest to give the armament of the most famous ship (except the Ark) of all time—H.M.S. *Victory*. Her tonnage was only 2,162, and she had four decks. On the lower deck were thirty long 32-pounders, on the middle deck thirty 24-pounders, on the main deck thirty-two 12-pounders, and on the upper deck (at Trafalgar) four 32-pounder carronades and eight short 12-pounders, with two 68-pounder carronades on the forecastle. The total weight of her broadside of 52 guns was 1,160 pounds, which is slightly more than half the weight of one discharge from one of the modern *Nelson's* nine 16-inch guns. And when we remember that the range of the *Victory's* guns was a few hundred yards and that of the *Nelson's* is about 20 miles the contrast is even more impressive. All the *Victory's* guns were muzzle-loaders of simple type. Nelson's attitude to improvements was governed by his dominant desire to "close" the enemy, and he would have nothing to do with inventions which might prevent or discourage this. When offered gun-sights of a new pattern he sent a characteristic refusal on the ground that he meant to get so close to the enemy that it would be impossible to miss the target, sights or no sights; but Nelson was not bothered by long-range guns, high-explosive shells,

or torpedoes, or he would no doubt have been the foremost exponent of the doctrine of hitting as early as possible.

His simple and downright methods were right for his time, but after the war with France came the first signs of change. For over 159 years guns had been elevated and depressed by handspikes under the rear end, the exact angle being fixed by graduated wedges called "quoins," on which the rear end rested. Lateral training was effected by using the handspikes to lever the back of the gun-carriage in the desired direction, the gun's crew helping by hauling on ropes. The recoil was checked by a stout rope passed through a fixed ring at the back of the gun and made fast to the ship's side. After reloading at the muzzle the gun was run out again by the rope tackle attached to the side of the ship on either side of the port-hole.

With the passing of the wooden ship and the coming of steam and armour things began to move fast. The old slap-dash methods of manufacture and shooting would not do after the Crimean War. In 1854 Mr. William Armstrong, perhaps the most famous of all gun-makers, began by new methods to produce bigger, more accurate, and more powerful guns than any hitherto existing. Instead of casting his guns in one piece, he discarded cast-iron altogether, substituting steel and wrought-iron, and building guns in layers. This he did by first making an inner tube of steel and fitting round it in succession outer tubes of wrought-iron, which were first expanded by heat and allowed to shrink when in position by cooling till they fitted and gripped tightly, thus giving enormous

strength and greater safety to the gun. When the building process was complete the inner tube was bored to the proper dimensions and "grooved." These grooves were made spiral throughout the length of the gun, so that the projectile, which was lead-covered, engaged them and was made to rotate rapidly as it passed through the gun, which rotation lasted throughout its flight, thus giving far greater accuracy than the old spherical shot fired from a smooth-bore. Any gun thus treated is said to be "rifled." The bore, or calibre, of the gun gradually increased from rear to muzzle to reduce friction.

Armstrong's earlier guns were breech-loaders. At the rear end of the gun was the breech screw, revolved in the ordinary way by levers, and through the back of the screw the projectile and charge were inserted. When these were in position a steel or wrought-iron "vent-piece" was dropped into place between the powder chamber and breech screw, which was then screwed up tightly, thus firmly closing the gun. At first these guns did not always give satisfaction, as the vent-piece was sometimes blown out, so for the heaviest guns a return was made to the muzzle-loading principle, though the other Armstrong principles were retained.

Naval guns now tended to grow rapidly in size and power to deal with the growing thickness of armour carried by ships, and the greater accuracy given by precision in manufacture called for new sights, so that long-range hitting could be obtained.

The Armstrong gun design was not the only one in the field, Sir J. Whitworth having been at work on

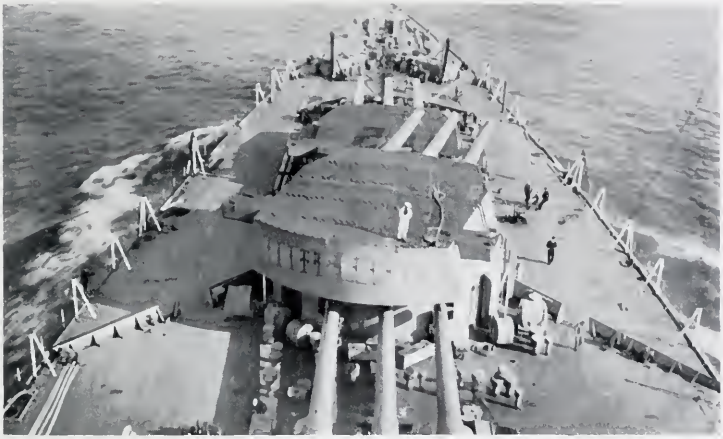
the same problems independently. His early guns were forged in one piece, first of iron, and then of steel, and an attempt was made at an alternative system of rifling by making the bore and the projectile hexagonal instead of grooved and lead-covered, but this had to be abandoned as unsatisfactory. Later on a modified built-up system was adopted, and with it ranges up to 9,000 yards were attained by Whitworth guns. In 1863 very severe trials of the rival systems were carried out, as a result of which the Armstrong type was adopted for its all-round superiority, and by 1864 the old smooth-bore, with its spherical, inaccurate, non-penetrating shot, was finally abandoned, and the battle of gun *versus* armour, which is still raging, began in earnest. The elongated, pointed, and swiftly rotating projectile was thenceforth supreme, for with this shape alone were velocity, accuracy, and penetration possible.

From 1865 the 6½-ton gun, the 12-ton, the 18-ton, and the 35-ton, firing projectiles of 115, 256, 410, and 820 lbs. respectively, followed each other in quick succession. It may be noted here that the power of a gun increases enormously with the increase in its calibre or bore; roughly, it may be said that in guns of any given date the power varies as the cube of the calibre, so that a 6-inch gun is not merely half as powerful again as a 4-inch gun, but is as 216 is to 64.

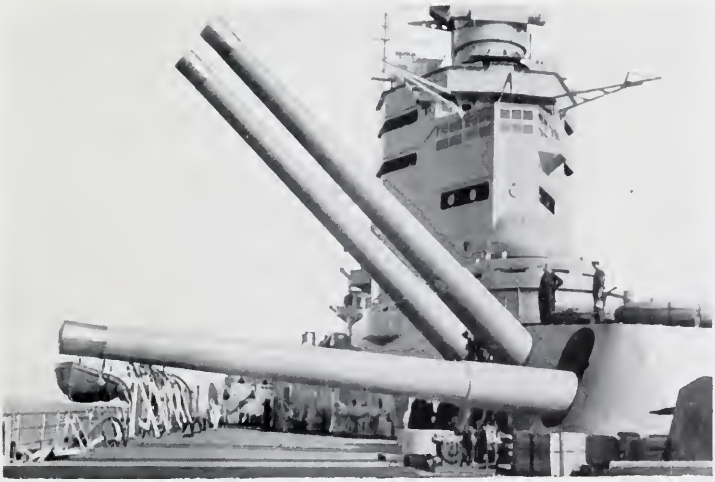
In 1875 a great step forward was made with the design of a monster 80-ton gun, which in its final form had a calibre of 16 inches and fired a projectile weighing 1,700 lbs. with a muzzle-energy of nearly 28,000

foot-tons. At this date it was customary to make projectiles with surface studs to fit the rifling-grooves of the gun; but it was found that the escape of gases past the studs, which naturally increased with the wear of the gun, caused much waste of power and unnecessary damage to the inner tube, so in the 80-ton gun a copper band was substituted for the studs and made a more gas-tight fit. This gun, the most powerful of its day, was placed in only one ship, the *Inflexible,* which mounted four, in two turrets amidships. In operation these monsters were as slow and unhandy as the *Inflexible* herself. They could only fire about once in five minutes, and were too long to run back into the turret for reloading, so arrangements had to be made for loading outside. In 1879 occurred the accident in the *Thunderer,* described elsewhere, when one of a pair of 38-ton muzzle-loaders failed to go off. Attention was therefore called to the breech-loader once more, as that system rendered such an accident impossible and solved the question of rapid internal loading. We were far behind our great rivals the French at this time, and it is perhaps lucky for us that the two fleets did not meet in battle. The persistence and ingenuity of the great Armstrong firm overcame both the difficulties of efficient breech mechanism and the objections of the conservative party in the Navy.

Simultaneously with the new breech-loaders experiments were made with gun-mountings worked hydraulically, and with new propellants of large grain and slow rate of combustion to take the place of small-grain gunpowder. It was found that a slow-burning



16-INCH GUNS OF H.M.S. RODNEY.
(NOTE RANGE-FINDERS PROJECTING ON EACH SIDE OF THE TURRETS.)



16-INCH GUN TURRET OF H.M.S. RODNEY.
(SHOWING TWO GUNS AT MAXIMUM ELEVATION.)

facing p. 134.

explosive gave better velocity with less strain than a quick and violent one. To take full advantage of this, longer guns were needed, which in turn demanded breech-loading more urgently than ever. Exhaustive tests were made at Elswick with Armstrong guns, which gave muzzle-velocities of 2,000 feet per second instead of the previous 1,600. This meant a harder blow and a flatter "trajectory" or flight, and therefore a better chance of hitting.

There were at this time two systems of breech mechanism, the German wedge system and the French screw, and we adopted the latter. It is obvious that if an ordinary screw, as in the earlier guns, is used to close the breech many revolutions are needed for its operation, so some ingenious mind devised a breech-block with an "interrupted screw," in which the screw surface is divided into six or eight parts, alternately plain and threaded. The female screw in the rear of the gun is similarly treated, so that the block can be pushed in straight with the plain surfaces opposite to the screw surfaces, when a short partial turn enables the screw surfaces of each to engage each other. Naturally, in this system the breech-block has to be longer to make up for the weakness caused by cutting away half the thread, but the rapidity of loading is not impeded thereby. Thus, with the breech open and the block swung clear to the side on its hinges, the following motions are needed for closing. Swing the block round till it is opposite the rear face of the gun, push it home, screw it up by a partial turn, and lock it with the locking lever. Till this lever is in position it is impossible to fire the gun. The difficulty of

securing complete gas-tightness is overcome by the obturator, which is a pad of asbestos between the breech-screw and the forward steel face of the breech-block, which, compressed by the explosion, spreads all round tightly against the bore of the gun, resuming its shape after the projectile has left the muzzle.

In the early eighties it was decided to build guns of steel only instead of steel and wrought-iron, which resulted in more powerful guns for equal weight, but involved greater care in construction. It is impossible here even to enumerate the different problems that must be solved in modern gun design, connected with qualities of metals, expansion and contraction, strength of parts, pressures, length, erosion, etc., which have engaged the attention of some of the finest scientific brains in the country. These problems would never be suspected by the casual visitor, who only sees a vast, plain tube of austere and forbidding navy grey when he goes alongside the *Hood* or the *Nelson;* but the breech mechanism of one of their guns is considered one of the most wonderful pieces of mechanical ingenuity existing.

Not long after the adoption of all-steel manufacture, a fresh method began to be used, by the employment of steel wire wound tightly round the inner tube of heavy guns and inside the outer jackets. This plan was not altogether new, as it had been thought of as early as 1850, but at first it was not found practicable. The advantage of the system lies in the fact that wire is the strongest form of steel, and by the nature of things a succession of layers of wire round

a gun forms a very good guarantee against an extensive fracture or burst. On the other hand, wire-winding provides no "girder strength," which is very important in long guns, so special pains have to be taken to avoid any tendency to droop. After some vacillation the wire system was fully adopted for big naval guns in 1890, and ever since then it has held the field, though other nations have not all followed our example. Before the final decision, however, much was done in the design of big guns without the use of wire. The 80-ton muzzle-loaders of the *Inflexible* were followed by the 12-inch 45-ton guns of the *Colossus,* which were breech-loaders, firing much more rapidly and with greater precision a 714-lbs. projectile with a muzzle-velocity of 1,914 foot-seconds. They were succeeded in the largest ships by the 13·5-inch 67-ton gun as mounted in the *Anson, Trafalgar,* and *Royal Sovereign* classes. These were fine guns, firing a projectile of 1,250 lbs. weight with a muzzle-velocity of 2,016 foot-seconds, a muzzle-energy of 35,230 foot-tons, and a penetration of 28 inches of wrought-iron at 1,000 yards range. The final step in the unwired gun was taken when the colossal 16·25-inch gun, with a weight of 110½ tons, was designed and mounted in the *Victoria, Sanspareil,* and *Benbow,* each ship carrying two of them. The projectile weighed 1,800 lbs. (more than three-quarters of a ton), the muzzle-velocity was 2,087 foot-seconds, the muzzle-energy no less than 54,390 foot-tons, and a penetration of 32 inches of wrought-iron at 1,000 yards was secured. Although a fair hit with one of these monsters was likely to be destruction to an enemy

ship, they had grave defects. Their weight was such that no battleship of ordinary size could carry more than two of them, they were only able to fire once in two and a half minutes, they were inclined to bend, their "life" was only about eighty rounds with full charges, and each discharge was extremely expensive, so that the balance of advantage was soon seen to be with the ship carrying four 13·5-inch guns firing considerably faster. For smaller ships, such as the *Barfleur,* which was designed to be able to pass the Suez Canal, and operate in shallow waters, the main guns were of the 10-inch type of a weight of 29 tons, and for large cruisers the 9·2-inch of 22 tons weight.

With the advent of the wire gun the pendulum swung still further away from the monstrous 110-tonners, and from the "Majestic" class of 1894 all battleships were for many years armed with a 12-inch weapon, which at first weighed 46 tons and later 58. The earliest type was comparatively short, only 37 feet 3 inches, and fired a projectile of 850 lbs. weight, but with a muzzle-velocity of 2,400 foot-seconds, a muzzle-energy of 33,000 foot-tons, and a penetration of nearly 35 inches. The strong points were improved accuracy and greater rapidity of fire, which was about once a minute. The wiring process was very elaborate and exact, rather more than 110 *miles* of wire ¼ inch by 1-16th being wound on, layer on layer. The greatest care had to be taken throughout, and at first each gun took about nine months to build. Another novelty in the 12-inch 46-ton gun was the substitution of "cordite" for prismatic gun-

powder as a propellant. Cordite gets its name from its similarity to cord. It is a compound of nitro-glycerine and gun-cutton, with a small percentage of vaseline. Its merits as compared with gunpowder are that it is twelve times as powerful, it is slow burning, thus giving a steadier push to the projectile and greater velocity without strain on the gun, it is comparatively smokeless, and it is much lighter, which enables a greater quantity of rounds to be carried.

Projectiles.—All this time we have been mainly concerned with the gun, and have said very little about projectiles, whose variety since the earliest days of gunnery has been astonishing, so great is man's ingenuity in exterminating his enemy. The first gun projectiles were those which David used against Goliath, and the Romans hurled from their catapults —stones. It was found before long that stones were apt to break up when fired, so experiments were made with iron and lead covered stones, then with cast-iron balls, and iron balls filled with lead. Bars of iron were tried, but they did not carry so far or so accurately as round shot. Red-hot shot were sometimes used with great effect against wooden ships, a noteworthy instance being the repulse of the grand attack on Gibraltar in the last years of the eighteenth century. "Case-shot," carrying quantities of small shot, nails, stones, etc., were found to be very deadly against men in close formation, and for the destruction of rigging shot in pairs, connected by chains or bars, were used.

It is hard to say when bursting shells first appeared,

but the Chinese, as in the case of gunpowder, certainly have a strong claim to priority. In European warfare there is definite mention of them at the siege of Bonifacio in Corsica in 1421, the attack on Algiers in 1681, and on other occasions. Even gas attacks are no new thing, as shells which produced clouds of evil-smelling smoke have been well known for a great many years, being first mentioned in the seventeenth century.

Before the middle of the nineteenth century, however, the favourite projectile at sea was the round shot, varied, and often accompanied, by shell and "grape" shot or "canister." An improved form of this last was invented by General Shrapnel in 1803, who gave his name, first to hollow shot, which broke and scattered, and later to a shell filled with explosive and small bullets, which was fired from a gun instead of, as shells had been previously, from a mortar, thus increasing its range and accuracy greatly. The shrapnel shell was used against the French in the Peninsula War, and was found so useful against masses of men, owing to its widespread effect, that it remains, in a greatly improved form, to this day, under the same name. Incendiary shells for burning wooden ships, stores, etc., and shells for illuminating the enemy's position have also received much attention from inventors, the latter culminating in the very efficient star shells used by the Germans at the Battle of Jutland.

Like ships and guns, projectiles began to make more rapid progress about the middle of the nineteenth century, when the battle of gun *versus* armour began

with the aid of scientific methods of design. We have already seen how the old round shot had to give place to the elongated and pointed projectile, and how the surface-studs were superseded by gas-tight driving bands, and in 1863 Major Palliser brought out the cast-iron shot and shell with hardened heads which bore his name. The shell contained loose powder, which was exploded by the heat produced by striking the target, and was admirable against thin armour or unprotected parts of ships; but for the thicker and compound armour that later years brought forth the Palliser projectiles were replaced by tempered steel missiles contrived by Ferminy and Holtzer. With the *Inflexible's* 24-inch armour it seemed as if the gun, at all events for vital parts, was defeated; but before long another device followed the hardened points—*i.e.,* the Johnson cap, which was a cap of soft metal fitted over the hardened point. This took the first blow, and acted as a sort of lubricant to the rest of the head on entering, the great object being to penetrate first and then explode inside, a shell which burst outside armour being comparatively harmless. Shell are therefore divided into four classes: shrapnel, for use against bodies of men, etc.; high-explosive, with thin walls and filled with "lyddite," against unarmoured parts of ships; armour-piercing, with thick walls and protective cap for the penetration of vital and well-armoured parts; and common shell, which are a compromise of the last two. It must be remembered that the problem of penetrating armour is complicated by the fact that impact is seldom at right angles to the surface encountered, and generally somewhat oblique

or, at long ranges, steeply descending. Our own shell at Jutland were found to be far too sensitive, exploding before penetrating and sometimes bursting on touching the water, a fact that gave the Germans great cause for thankfulness.

Reverting once more to guns, we find that after the *Inflexible* the development of the torpedo and torpedo-boat made it necessary to take fresh means of defending the heavy ships from the new weapon besides the clumsy crinoline that was called the torpedo-net.

The first method of repelling torpedo attack was by rifle-fire, and an old newspaper illustration shows H.M.S. *Colossus* in the eighties with nets out and her crew lining the deck, repelling the mosquito craft in this manner. Then the machine-gun, in the shape of the Gatling, Gardner, Nordenfeldt, and Maxim, took the place of the individual sharpshooter. The Gatling had ten barrels revolving in a circle, each firing on reaching a fixed point, and it could, when it did not jam, fire some 500 shots a minute. The Gardner and Nordenfeldt had their barrels, up to five in number, side by side. The Gardner was also apt to jam at inconvenient times, and was replaced by the more trustworthy Nordenfeldt, which could fire 600 times in a minute. The Maxim, surviving as the Vickers-Maxim and then as the Vickers, was the best, and was on quite a different principle. It had one barrel of ordinary rifle calibre, round which was a brass water-jacket to keep the barrel cool, and it was fed by cartridges on a long belt folded into a box at the side. The breech mechanism was a marvel of ingenuity, and enabled the gun to go on firing at the

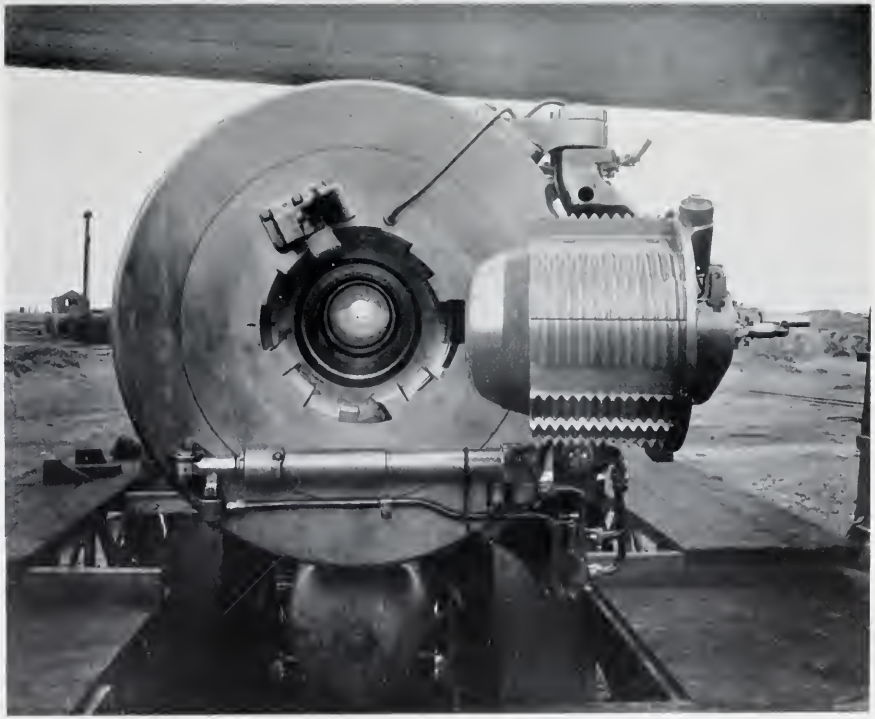
will of the gunner while the cartridges in the belt lasted, the recoil and return actuating the ejecting and loading mechanism at the rate of over 600 rounds a minute. It was mounted on ships on a pedestal, to give easy handling and steady aim.

As torpedo craft increased in size, speed, and protection, and the torpedo itself in size, speed, accuracy, and range, these small guns were found inadequate, so guns firing 3 and 6 lb. shell with great rapidity were turned out by Hotchkiss and Nordenfeldt. By new and simple breech mechanism a high rate of fire, about fifteen per minute, was reached, and by a well-balanced pedestal mounting the gunner was enabled to keep the gun trained on a moving object, his shoulder pressed against a shoulder-piece, while one man worked the breech and another handled the cartridges. The breech was of the falling block type, a heavy steel block in the rear of the gun being pushed up to close and dropped to open the breech by a crank at the side. The falling block also operated a claw, which extracted the empty cartridge-case. The recoil was taken up by hydraulic pistons, and the return was effected by a powerful spring. The general arrangement of the 6-pounder quick-firer was similar, and the 12-pounder was a development of it. For some years these guns were sufficient to account for torpedo craft before they could get within firing range for their torpedoes.

The reduction in the area of armour protection of ships' sides made it worth while to apply quick-firing mechanism to larger guns, with the object of shattering the unarmoured portions with a hail of compara-

tively small shells, and in 1887 the Elswick firm turned out a 4·7-inch gun weighing 42 cwt. and firing a 40-lb. shell, which was adopted as the secondary armament of many cruisers and battleships. This gun could fire twelve aimed rounds in one minute instead of about five and a half minutes for the same number in the old patterns. The next step was to a 6-inch quick-firer of 5 tons weight and later of 7 tons 13 cwt., firing a 100-lb. shell at the rate of ten per minute. Both these were wire-wound guns of high velocity, with an improved breech-block of conical instead of cylindrical shape, a change which made it possible to swing aside the breech-block in one motion instead of first pulling it straight out. The firing was done either by electricity or percussion. While the lighter quick-firers are easily aimed by balance, the heavier are elevated and trained to a nicety by hand wheels; and in the later models the breech-block is revolved and swung clear by a single motion of one lever, thus increasing the speed of operation considerably.

Turning once more to the big gun, we find the 12-inch gun holding its own from the time of the *Majestic* of 1895 to the *Hercules* of 1910, but improving in power and accuracy with each new model or "mark," as it is called, so that the *Majestic's* gun, with its 46-ton weight, 2,397 foot-seconds velocity, 33,020 foot-tons energy, and 32·7 inches of penetration at 1,000 yards, becomes in the *Hercules* one of 58 tons weight, 2,900 foot-seconds velocity, 47,697 foot-tons energy, and 46·2 inches penetration. The improvement in the other naval guns is just as notable, the



15-INCH GUN: REAR VIEW WITH BREECH OPEN SHOWING INTERRUPTED SCREW

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facing p. 144.

last model of the 9·2-inch gun, which formed the main armament of the armoured cruisers, having more than twice the power of Marks I and II.

After the *Hercules,* which was the tenth of the "Dreadnoughts," the pendulum swung again in the direction of heavier and more powerful guns, and the next three classes of battleships carried the 13·5-inch gun, a vast improvement on the weapon mounted in the *Royal Sovereign* of the nineties. This piece in its later model fired a projectile weighing 1,400 lbs. at a muzzle-velocity of 2,580 foot-seconds and had a muzzle-energy of 57,770 foot-tons. Shortly before the Great War another jump was made in great secrecy to the 15-inch gun, in order to steal a march once more on the Germans. It was a big risk, because it was adopted on theory only, the usual experimental gun being dispensed with, and two whole classes of battleships of five each were thus committed to it without the usual trials; but the results were triumphant, and the 15-inch gun, weighing 97 tons, firing a shell of 1,850 lbs. with a velocity of 2,500 foot-seconds and an energy of 88,000 foot-tons, did great damage at Jutland. After Jutland there was a space for thought, and though one 18-inch gun was mounted in the *Furious,* it was afterwards removed, and now by the Washington Treaty no gun greater than 16-inch calibre may be mounted. This is carried by the *Nelson* and *Rodney*. Though some official reticence is observed about them, they are believed to be of 108 tons weight and to fire a shell weighing just a ton at a velocity of 2,650 foot-seconds and a muzzle-energy of 94,000 foot-tons. Though

the calibre of guns is now limited by international agreement, there is still plenty of scope for the gun designer's brain. The standard cruiser gun of 8-inch calibre weighs about 17 tons and fires a 250-lb. shell at a muzzle-velocity of 3,000 foot-seconds with an energy of about 17,000 foot-tons.

This short account of guns from the earliest times may well conclude with a comparison of the principal gun of Nelson's day, though not the largest, with that of the modern battleship bearing Nelson's name.

	1800.	1928.
Material	Cast-iron	Steel and wire.
System	Smooth-bore	Rifled.
Loading	Muzzle-loading	Breech-loading.
Weight	2 tons 12 cwt.	108 tons.
Calibre	6·4 ins.	16-inch
Projectile	32 lbs. solid	2,248 lbs. shell.
Charge	10 lbs. powder	500 lbs. cordite.
Energy	400 foot-tons	94,000 foot-tons.
Penetration at 1,000 yards (wrought-iron)	Nil	Nearly 5 feet.
Range	600 yards	20 miles.

Torpedoes.—Before the coming of the Whitehead torpedo any under-water explosive machine, whether offensive or defensive, moving or stationary, was called a torpedo. There were torpedoes which were towed across the bows of the enemy; spar torpedoes which were mounted on the ends of long poles from the bows of launches and only depressed just before the attacking launch got to striking distance; and fixed submarine mines which were exploded by electricity or by contact with a moving ship. Rockets were also used to discharge them.

The name now really belongs only to the locomotive type with self-contained engines. Both torpedoes and mines, in effective shape, received their first successful trial during the American War of North against South, when thirty-four vessels were blown up by one type or the other. Naturally, they were very primitive in design, but so were the attacked ships, which were not so minutely subdivided nor so strongly built as they are now, and therefore were more easily sunk.

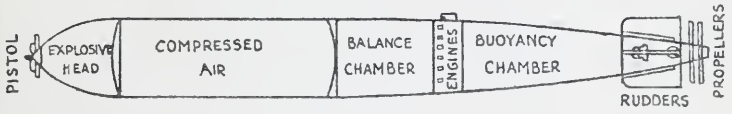
There was no doubt about the success or the future possibilities of this form of warfare, and many brains were quickly at work on the subject. In 1864, two years after the American War, Captain Luppis, of the Austrian Navy, hit on the idea which has developed into the deadly weapon of the present day. His first notion was of a small body, floating on the surface, driven by clockwork or steam, and guided by lines till it reached the target, when the gunpowder in its head exploded automatically. After some experiments on his own account he put his scheme before the Austrian Government, but the crude driving and steering mechanism prevented its acceptance. He persevered, however, and discovered a most valuable engineering brain in Mr. Whitehead, manager of some works at Fiume. They put their heads together, and Mr. Whitehead soon cut a corner by abandoning the surface-propelled, line-guided torpedo, and substituting for it a weapon which would run below the surface at a chosen depth and independent of any control when once discharged. Two years of hard work and original thinking were spent

before the first Whitehead torpedo was ready. It had all been done in complete secrecy, only Mr. Whitehead's young son and one workman being associated with them in the construction. It was, roughly, cigar-shaped, with a weight of 300 pounds and a diameter of 14 inches, with an explosive charge of 18 pounds of dynamite in the head. It was propelled by compressed air, and could manage a speed of six knots for a short distance. In water free from currents it could keep a fairly straight course, but the great difficulty was to make it keep a constant depth below the surface—it persisted in coming to the top or sinking to the bottom. The Austrian Navy was by this time aware of the progress made, and started experiments with it in a gunboat, while Mr. Whitehead tackled the great problem of uniform depth. He partly solved it in 1868 by the adoption of the "balance chamber," a device which was treated as a profound secret for years after every naval power had got hold of it. This will be described later on.

The Austrian Government, though impressed, felt unable to spend money on further trials, and Mr. Whitehead approached the British Admiralty, which, after a short inquiry, ordered two torpedoes, which were tried thoroughly and successfully. In spite of the naval "conservative party," at that time very strong, the British Government acted on the enthusiastic report of the trials committee, and bought the secret together with the right to manufacture. At the present date every navy uses the Whitehead in a very highly developed form, though there are many

different patterns. The first models were shaped with "fine" heads like fast surface ships, but it was discovered that fully submerged bodies, which did not make waves, travelled best with blunt noses, and it was noticed that the fastest swimming fish were bluff-headed with tapering tails.

A general description of the torpedo is as follows: In the bluff head is the explosive charge of gun-cotton or trotyl, in the extreme nose of which is the pistol, which explodes the charge on striking the target. The blow need not be directly head-on, as side-pro-



TORPEDO

jecting whiskers are provided to cause explosion by an oblique blow. Naturally, great care must be taken that no explosion occurs till the torpedo is fired and is well away from the ship, so three safety devices are fitted. Firstly, there is a safety pin, which is not removed till the last moment. Secondly, after firing, the rush of the torpedo through the water causes a small fan to revolve till it falls clear of the pistol; this is designed to take about 14 yards. Thirdly, the blow must be sufficiently violent to shear a second pin before the point of the striker is driven against the detonator, which explodes the "war-head."

Just abaft the explosive head is the *air chamber,* made of fine steel, which corresponds to the boilers of a ship and contains very highly compressed air,

which is pumped into it before the torpedo is used. The result of cramming so much air into so small a space is that the buoyancy of the torpedo is *reduced,* not increased.

Next abaft the air chamber is the *balance chamber,* containing the mechanism for preserving the proper depth of the torpedo during its run. This is done in two ways. Firstly, there is a swinging weight, which is affected at once by any alteration in tilt, up or down, which might cause the torpedo to break surface or dive to the bottom. It was quickly found that this pendulum alone was not strong enough to actuate by its own weight the horizontal rudders which correct the vertical deflection of the torpedo from its proper depth, so a "servo motor," contained in the engine room, was designed to give additional power, being set in motion by the action of the pendulum. Obviously, before the torpedo could be kept at a desired depth it must first attain that depth, and to secure this a hydrostatic valve is fitted to correspond to the pressure of water at the depth at which it is desired to run, so that when the depth is too great the valve is forced in and the torpedo returns to its proper position. Besides all this delicate mechanism, further controlling gear is fitted to counteract the tendency of the pendulum to be left behind by the first shock of discharge and while the torpedo is gathering speed. This gear suspends the operation of the horizontal rudders till sufficient time has elapsed for entering the water and gathering way.

The *engines,* which come next after the balance chamber, are themselves marvels of ingenuity and

accurate workmanship. They use the compressed air from the air chamber to drive two screws revolving in opposite directions at the stern of the torpedo, and they are adjusted before firing to run either at maximum speed for a short distance or at a lower speed for long ranges. The air once used by the engines has to escape, and this makes a path of bubbles, which rise to the surface and can often be clearly seen from the bridge of the ship attacked, though the torpedo is, of course, somewhat in advance of its visible track. In very many cases it has been found possible to avoid an oncoming torpedo by the use of helm, but when the cleverness of inventors has succeeded in abolishing the path of bubbles the deadliness of the torpedo will be much increased.

In recent years much greater speeds have been attained by heating the air in the air chambers before discharge.

Abaft the engine room is the *buoyancy chamber,* the primary purpose of which is naturally to give the requisite buoyancy to the torpedo, but it contains also a very ingenious instrument for keeping it on its aimed course. It will already have occurred to the reader that several things may happen to deflect the torpedo after it has been fired from a moving ship, such as the head striking the water first, a sea striking it if it breaks surface, or currents. To counteract any of these the *gyroscope* is now fitted in the form of a fly-wheel revolving at enormous speed and delicately suspended. The gyroscope, as every schoolboy knows, tends always to maintain its direction, and in the torpedo it is used in conjunction with a servo

motor to actuate the vertical rudders and correct any deflection as soon as it occurs. The fly-wheel is driven by a powerful spring, wound previously to discharge and released at the same time as the compressed air is put into action when the torpedo is fired.

Near the opposed propellers are the vertical and horizontal rudders, which keep the torpedo on its course and prevent it from sinking or jumping out of the water. In spite of the ingenuity and accuracy of the mechanism, however, torpedoes have been known to miss big ships by diving beneath them and small ones by jumping over!

The tubes from which they are fired are either submerged, as in most large ships, or above water, as in light cruisers and destroyers, and the firing impulse is either compressed air or explosive. Very small craft and aeroplanes of all types have a third method—viz., dropping gear. The submerged tube has two advantages in that the torpedo cannot be damaged by gun-fire while in the tube, and the moment of firing cannot be detected by the enemy, often an important matter. Ingenious mechanism is provided to support the whole length of the torpedo till it clears the ship, and arrangements are made so that in practice it rises at the end of its run and in war it sinks to the bottom.

It is not possible here to give the details of the latest type of torpedo, as these are very properly kept secret, but the main features of the 21-inch Whitehead torpedo are, range 15,000 yards or even more, full speed 43 knots, and charge of explosive

Photo: Crabb, Southsea.

TORPEDO BEING FIRED FROM ABOVE-WATER TUBE IN A DESTROYER.

facing p. 1

600 lbs. These figures have, it is needless to say, been much exceeded in the latest experimental type. Efforts are being made to control torpedoes by wireless after discharge.

Mines.—Mines have in the past been called infernal machines and torpedoes, but the mine proper is now a stationary metal case filled with high explosive, which is anchored below the surface and is exploded either on contact with a moving ship or by the action of an observer on shore. Most of those used during the war were of the former type, and for a long time they proved very deadly. Before the war mines were somewhat neglected by the British Navy, as they were regarded as more suitable for use by the weaker side, not by the fleet whose policy it was to entice the enemy out to battle instead of bottling him up in his harbours. The German pattern proved more efficient than our own, and at the crisis of the war they were copied by us in huge numbers rather than waste time on experiments. An ordinary mine contains about 600 lbs. of high explosive, and by means of a hydrostatic valve can be arranged to maintain a constant desired depth to within a foot or two, not only to escape detection, but to get in its explosion against the most vulnerable part of the opposing ship. Explosion is effected by electric contact, and is enough to cripple if not sink most ships. The reason for the change of policy on our part towards the mine was the submarine, which became such a serious menace that it had to be combated by every means at our disposal, the mine being one of the most effective. Mines were laid either by

special surface craft or by submarines. It was a mine laid by a German submarine which sank the *Hampshire* with Lord Kitchener on board.

Depth Charges are another effective weapon against submarines. They are really small mines dropped or projected by howitzers from fast light craft like destroyers, which steam at high speed towards a place where a submarine has been sighted and drop a pair of charges as near as possible to where she is expected to be. Depth charges are arranged by hydrostatic valve to explode at 40 to 60 feet depth, and they are very efficient against the comparatively flimsy hulls of under-water craft.

Paravanes.—With the rapid development of the mine went, as usual, experiments to combat it. It was both an urgent and a baffling problem, which was finally solved by Commander Usborn and Lieutenant Burney, now Sir Dennistoun Burney, son of Admiral Sir Cecil Burney, Second-in-Command of the Grand Fleet. The paravane is a steel contrivance towed on each side of a ship by steel ropes attached to the stem. It is adjusted to run submerged about 50 feet from the ship's side and about 180 feet from the stem. It acts by fending off the mine's mooring chain with the steel rope, which leads the chain to the powerful jaws of the paravane itself, which break it, with the result that the mine comes to the surface and can be easily destroyed. The reader will reasonably ask what happens when the stem of the ship hits a mine fair and square, and the answer is that it never does, because the cushion of water which a ship's stem pushes in front of her

PARAVANE.

(NOTE THE JAWS AT THE TOP.)

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facing p. 184.

has the effect of deflecting the mine to one side or the other without actually striking it. This device did much to preserve both men-of-war and merchant ships from destruction. Needless to say, experiments are now being made for defeating the paravane!

CHAPTER VII

TYPES OF MODERN SHIPS AND THEIR FUNCTIONS

In wild nature every beast seems to be the prey of some other beast, and in naval warfare the same may be said of the different types of ship. In the days of Nelson the line-of-battle ship could go anywhere without fear of any foe but an equal or superior specimen of her own kind, but the development of under-water weapons has modified that serene supremacy. The battleship, as it is now called, is still the final and deciding factor, and sea power is based on it as in the old days. There have not been lacking sceptics who, like Admiral Sir Percy Scott, say, "What is the use of a battleship?" and they are not satisfied with the reply that the battleship exists to fight other battleships and cruisers. It was predicted with some confidence before the war that no battle fleet would dare to put to sea for fear of torpedoes; but when war came the fleet, with destroyer protection, never hesitated to do so, but it was afraid, and with reason, of resting at anchor in an unprotected harbour such as Scapa Flow was for so long.

The best way to settle the question is to imagine every type but torpedo craft abolished. What happens then? Something has to be contrived to tackle the torpedo-boat and submarine, and this is now chiefly the destroyer. To tackle the destroyer the larger and more weatherly light cruiser would soon be produced.

Photo: Webb, Southsea.

H.M.S. ADVENTURE.

MINE-LAYER: 6740 TONS. 40,000 HORSEPOWER. $27\frac{3}{4}$ KNOTS.

(NOTE SQUARE STERN AND DOORS THROUGH WHICH MINES ARE DROPPED.)

facing p. 156.

The large armoured or deck-protected cruiser would then come along to smash the light cruiser, then the battle-cruiser, till finally we should find ourselves back at the battleship, which, to complete the circle, is guarded from torpedo craft by her own swarm of destroyers.

In the old days of sail there were many types—line-of-battle ships (that is, ships fit to lie in the line of battle), which might have two, three, or even four decks of guns; frigates, which corresponded to the modern cruiser; brigs, corvettes, despatch vessels, etc., all with their own duties.

The main classification at present is into battleships, battle-cruisers, cruisers, destroyer-leaders, destroyers, monitors, gunboats, submarines, aircraft carriers, coastal motor-boats, the two first being also called "capital ships"—*i.e.*, ships capable of lying in the line of battle.

The *battleship's* duty is simple—to fight the big battles, not, as a rule, alone, but in company with others of the same class. Big battles being few and long between, the battleship keeps the ring and "masks" the enemy battle fleet. She is therefore of great size, carries the biggest guns, thickest armour, and large fuel supply, is moderately fast, minutely subdivided to minimize damage from torpedoes, and carries several torpedo-tubes for use if the range is short enough. The *battle-cruiser* is the last development of the restless and sometimes chaotic history of the cruiser. Her duty is to smash up enemy cruisers of whatever type, and, if used in the line of battle, to act as a "fast wing" to bring a crushing concentration

of force where it is most wanted. In order to do these things she also is of great size, carries the heaviest guns, though generally fewer of them than the battleship, has engines to drive her at 30 knots and more, and carries about half the weight of armour of her slower and sturdier sister. Owing to her great length she can overhaul nominally faster destroyers in anything but fairly calm weather. It seems that no more battle-cruisers will be built for the present, and that the fast wing will be more like battleships and less like cruisers.

The *cruiser* proper has more varied functions. She is too small and weak to lie in the line against battleships, and she exists to scout—that is, to get information and pass it back to the flagship, to destroy her "opposite numbers" in the enemy fleet, sink torpedo craft, protect our merchant ships, capture or sink those of the enemy, police the seas, and show the flag all over the world. Lord Palmerston used to say that if there was a job in a distant part of the world that needed tact, clear thinking, and resource, he always called in a Captain of the Royal Navy to deal with it, and naval officers from Nelson to Mr. Kipling's mythical "Lieutenant Bai-Jove Judson" have always shown extraordinary aptitude for this kind of work. Ever since steam came in there has been great divergence of opinion as to the best type of cruiser, so we have had a bewildering succession of armoured, deck-protected, large, small, fast and moderately slow ships. The present classification is simply "cruisers," these being at the moment limited in size and type of gun by the Washington agreement; but there is no telling

how long this will last, the difficulty of settling such matters by international agreement being considerable. The two newest classes are of 10,000 and 8,000 tons, the former carrying eight 8-inch guns and steaming at 33 knots.

The *destroyer-leader* or *flotilla-leader* is, as might be expected, a sort of glorified destroyer, being larger, longer, and more powerfully armed than the destroyer proper. The latest type is of 1,480 tons and 40,000 horse-power, and carries five 4·7-inch guns and lighter anti-aircraft guns, with two triple torpedo-tubes. The speed is 36 knots. Her duty is to act as flagship to destroyer flotillas.

The *destroyer* acts in flotillas, and her duties are to sink her own kind in the opposing fleet by gunfire, torpedo the larger enemy ships, protect her own larger ships from torpedo attack, set up smoke-screens when wanted, and destroy her deadly enemy the submarine. She is lightly built in order to attain the highest speeds, and her life is comparatively short.

The *torpedo-boat* now hardly exists, having been made obsolete by the larger and faster destroyer, but it was the forerunner in this class of vessel. When the torpedo first began to be an effective weapon, the French, with the kind of logic that so often lands people in awkward situations, argued that if a 60-ton torpedo-boat could sink a 10,000-ton battleship it was obviously useless to go on building battleships, so for years they neglected the battleship and built swarms of torpedo-boats. The British, with clearer vision, set about devices for protecting their battleships by subdivision, nets, and quick-firing guns, and invented

destroyers for the double duty of attending to the torpedo-boat and acting themselves as torpedo craft.

Gunboats are chiefly used for foreign service, where it is necessary to proceed far up rivers, such as the Yang-tse-kiang and the rivers of West Africa. They cannot keep the sea while hostile cruisers are about, being too small and weak either to fight or run away, but in time of peace they are useful craft.

The *submarine* is the most troublesome craft to tackle of any that exist, and the unscrupulous use of them by Germany during the Great War gave Britain many months of grave anxiety. Though it is the last but one of modern weapons of war, it is by no means new. As early as 1776 Bushnell attacked H.M.S. *Eagle* by submarine with "torpedoes," which meant explosive of some sort, but it was not till the locomotive torpedo became effective that it took shape. Submarines work by stealth, invisibility, and surprise. They are comparatively small and fragile, and under water they are slow. This does not matter much while they are undetected. Their general shape is that of a fat cigar, well adapted to stand the pressure of fairly deep water. In order to be able to dive and remain below the surface they are given tanks, which can be filled with water or emptied by compressed air at will, and the utmost care has to be taken in order to dive at the right angle, since a rapid and deep dive might be too much for the strength of the hull. For travelling below the surface electric engines, which give off no fumes, are used, and on the surface generally oil engines, but sometimes steam. Their chief weapon is the torpedo, but most now-

adays carry light guns, and one British class actually carried a short 12-inch weapon. The speed is usually about 10 knots submerged and 15 to 17½ knots on the surface, but the British "K" class, using steam engines, can do 24 knots, and are thus able to work with the fleet in smooth weather. They are also used as mine-layers, for which they are well fitted. Special arrangements have to be made for keeping the air fresh while below the surface, and men have been known to remain alive for as long as three days after going down. In war submarines do not show on the surface more than they can help by day, but either move submerged or lie on the bottom till the proper time comes. When the hull is submerged they are able to keep up observation by periscopes, long tubes with reflectors sticking up above the hull and conning tower; but when moving in smooth water even these, with the wake they leave on the surface, often give away the presence of the deadly craft below, and at best vision by periscope is limited as compared with that from the bridge of even a small surface ship. For a considerable time no effective means of defeating the submarine could be found, but by the end of the war mines, nets, depth charges carried by destroyers and motor-boats, and listening posts which detected the beat of their propellers, succeeded. The largest submarines at present are of about 3,600 tons when submerged, and it will be understood that any great increase in size is paid for by less handiness and greater difficulty in hiding in shallow water.

Aircraft.—These are the newest weapons in use afloat, and there has been much debate on their effect

on naval tactics. They are divided into *lighter-than-air* and *heavier-than-air* machines. The lighter-than-air are, of course, the *airships,* huge gas-bags, 600 feet long or so, with small cabin-like structures attached underneath to house the engines, crew, etc. They have a wide range of action, can carry fairly heavy loads, and are able to hover without using their engines; but they are slow to start from their sheds, and, more important, they are so bulky that they can be seen and hit much more easily than aeroplanes. The heavier-than-air are the *aeroplane, seaplane,* and *flying boat.* The first has to start from and return to some flat, firm surface such as land or the deck of a ship, and those in use in the Navy are carried in *aircraft carriers,* special ships of great size intended to transport aircraft for attack on any distant object. They are mostly converted liners or converted battle-cruisers, the largest of which carry some dozens of aircraft between decks. It is hard to imagine anything more repellent to the eye of the sailor than these craft, which have either no masts and funnels, or carry them on one side of the ship, so that a large deck space is available for flying off and flying on. The duty of aeroplanes and seaplanes is fourfold—to scout, which their great speed and the height from which they can observe enables them to do better than any surface ship; to fight enemy aircraft; to attack by bombs and torpedoes; and to "spot" or signal the results of gunfire. The suddenness of attack by these mosquitoes will demand the utmost vigilance of the fleet and extremely accurate fire from their anti-aircraft guns. As usual, however, there is another

side to the picture; the size and comparative defencelessness of the aircraft carrier will make her a special mark for attack by the opposing fleet, and once she is sunk her aeroplanes have nowhere to return to. Again, flying off and on when the ship is rolling badly is likely to be a difficult and hazardous affair, and both operations will in any case necessitate her steaming for some time into the wind's eye, regardless of the convenience of the rest of the fleet, whose course may be quite different. The *seaplane* and *flying boat* start from the water and return to it, and can ride out fairly heavy weather when at anchor; but starting and alighting in rough weather are at present difficult, so seaplanes are usually based on harbours and river mouths, where smooth water can be counted on. At the Battle of Jutland one seaplane was used, which was hoisted out from H.M.S. *Engadine* and started from the surface.

CHAPTER VIII

SOME PRINCIPLES OF BATTLE-FLEET TACTICS

STRATEGY does not change, but tactics do owing to new weapons and the development of old ones. Tactics may be called the method of using armed force in touch with the enemy, and their object is to bring the greatest volume of hitting, whether with the gun, torpedo, or even ram, to bear on the enemy. The weaker fleet or an equal one will try to bring its whole force to bear on a portion of the enemy, but a greatly superior one will seek to annihilate, so that the necessity to engage a portion will be less urgent. It will, however, always be desirable to catch the opposing force at a disadvantage, otherwise superiority on paper may be useless if the tables are turned.

In the early days of the British Navy tactics were simple, and consisted of getting alongside and fighting hand-to-hand in single ship actions, using bows and arrows, stones from the tops, and cold steel; later a regular battle line was adopted; and, lastly, while sail survived, scientific concentration on a part of the enemy fleet, making use of the direction of the wind, before the unengaged ships could work up in support of those attacked.

In the modern steam navy the wind matters much less, being only effective through hampering gunnery

in a gale, or by the interference of funnel smoke, or by smoke-screens deliberately set up.

A fleet, like a land force, does not move in disorder either in peace or war, but cruises in compact formation, carries out complex movements, and varies its formation to outwit and outmanœuvre the enemy. It has an advantage over an army in that it does not have to stick to roads when moving out of sight of battle, and each ship carries its own complete stores and ammunition with it; but, on the other hand, an army knows better as a rule where the enemy is, and runs no risk of being torpedoed and mined hundreds of miles from his main force. Armies, again, do not approach each other at forty miles an hour, as fleets do. Just as a General throws out an advanced guard to provide against surprise, so an Admiral sends out a screen of cruisers and destroyers and aircraft to gain early news of the enemy's strength, position, course, and speed, and to keep off hostile torpedo craft and submarines.

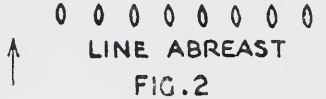
It is impossible to understand a modern naval battle unless we first consider some simple tactics and the reason for the adoption of one formation or another.

The two simplest formations for a battle fleet are *line ahead* (Fig. 1), in which ships follow each other at short distance in single file, and *line abreast* (Fig. 2), in which they move, as it were, nearly shoulder to shoulder, like a line of soldiers advancing. Line abreast, however, is not as good as it looks, because, battleships being designed to fire all their guns on the broadside, they cannot also use them all right

ahead or right astern, mounted, as they are, in several turrets. This is illustrated in Fig. 3, which is a rough plan of the *Queen Elizabeth,* representing,

LINE AHEAD
FIG.1

with modifications, modern battleships. There are eight heavy guns in four turrets, all of which can fire on either broadside through an arc of about



LINE ABREAST
FIG.2

240 degrees, but only four right ahead or right astern. It follows that ships in line ahead can use all their guns against an enemy on either side, but in line abreast they can only use half if the enemy is

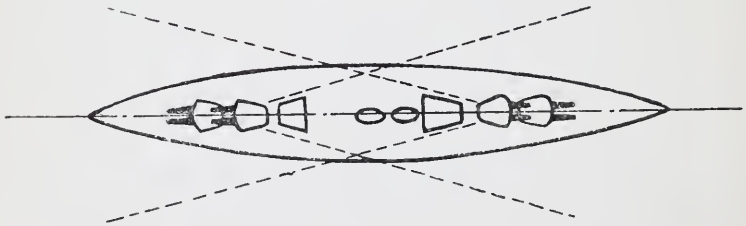


FIG.3

in front or behind; and if he is on one side ships will mask each other, and the fleet in line abreast will almost certainly have its "T" crossed.

"Crossing the enemy's T" is one of the great

objects in a modern naval battle, and a glance at Fig. 4 shows why. "A" fleet can concentrate all its heavy guns on a few ships of "B" fleet, which can only use a few in reply. When we come to read of the Battle of Jutland, we shall see how Admiral Jellicoe twice outwitted and crossed the "T" of Admiral Scheer, who only extricated himself, aided by thick weather, failing light, and a smoke-screen, with the utmost difficulty by flight. It is also evident

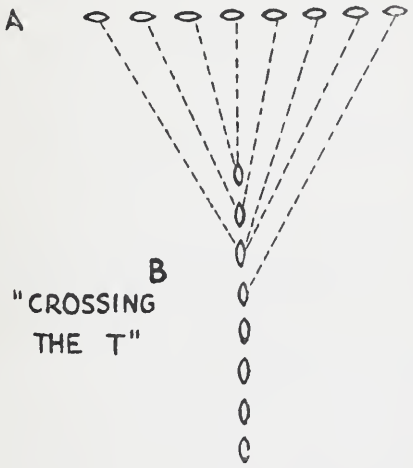


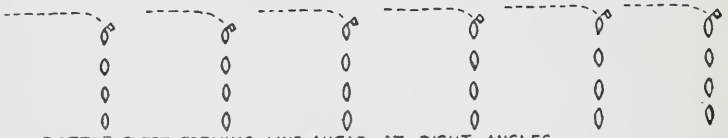
FIG. 4

that when fleets are on parallel courses one cannot suddenly or sharply "close" the other without temporarily sacrificing the use of a number of guns, in addition to upsetting the gunners by a rapid change of range.

Line ahead, therefore, is the battle formation generally favoured, but the line must, to be effective,

be in the correct position in relation to the enemy fleet if its advantages are to be utilized.

A line of ships such as Admiral Jellicoe brought into action at Jutland, consisting of twenty-four "Dreadnoughts," steaming in close line ahead, is some six miles long, and when out of touch with the enemy battle fleet it offers far too good a target for submarines and destroyer attack. It is obvious that if the distance from the bow of one ship to the

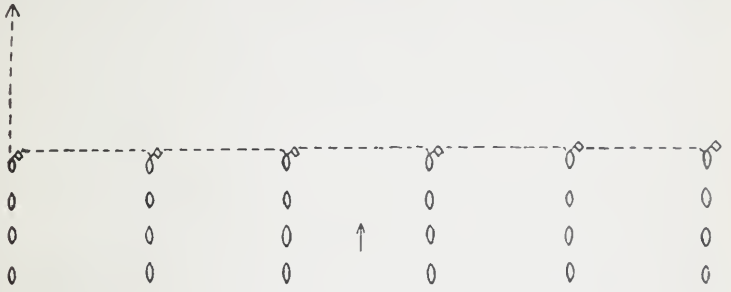


BATTLE FLEET FORMING LINE AHEAD AT RIGHT ANGLES

FIG. 5

bow of the next is 500 yards, and each ship is 200 yards long, a torpedo attack will get home somewhere in the line twice in five times if no alteration of course to avoid torpedoes is made. For cruising, therefore, and to enable the fleet to "deploy," or form battle formation, quickly and to the best advantage, a combination of line ahead and line abreast, as in Fig. 5, is used. Here we have "divisions in line ahead disposed abeam," each division in line ahead, but abreast of the other divisions. Each division is led by a flagship at such a distance from the rest that if line ahead is ordered it is only necessary for each flagship to lead round to right or left, and at 20 knots speed line ahead is reached, at right angles to the former course, in about three minutes. This cruising formation ensures compactness, rapidity of signalling, and

a reduced target against torpedo attack from a flank or any angle. If desired, the whole fleet can be wheeled in the same formation to a new direction. The enemy may, however, turn up from such a direction that a simple change from, let us say, cruising formation, steaming south, to line ahead, steaming east or west, taking only three minutes, would only result in his crossing our T, so that it

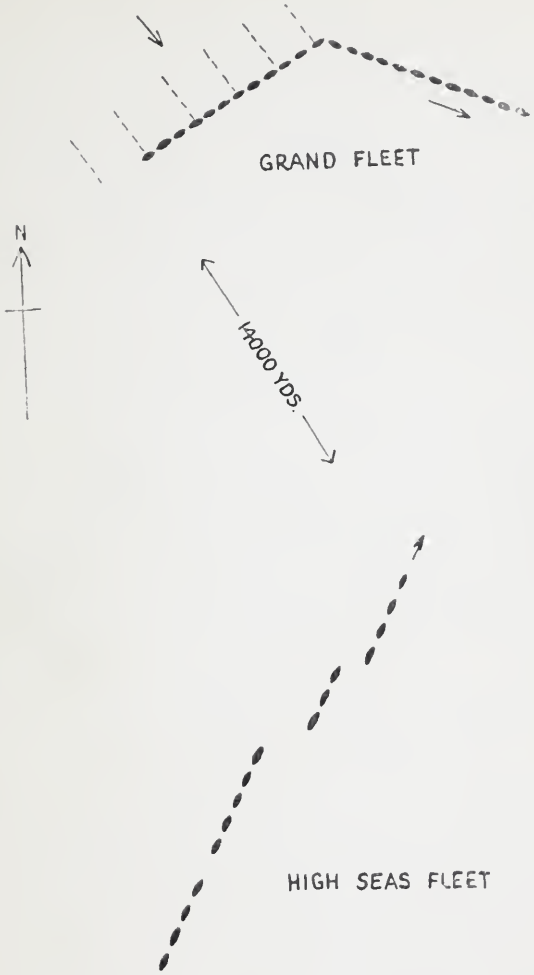


BATTLEFLEET FORMING LINE AHEAD MAINTAINING THE SAME COURSE

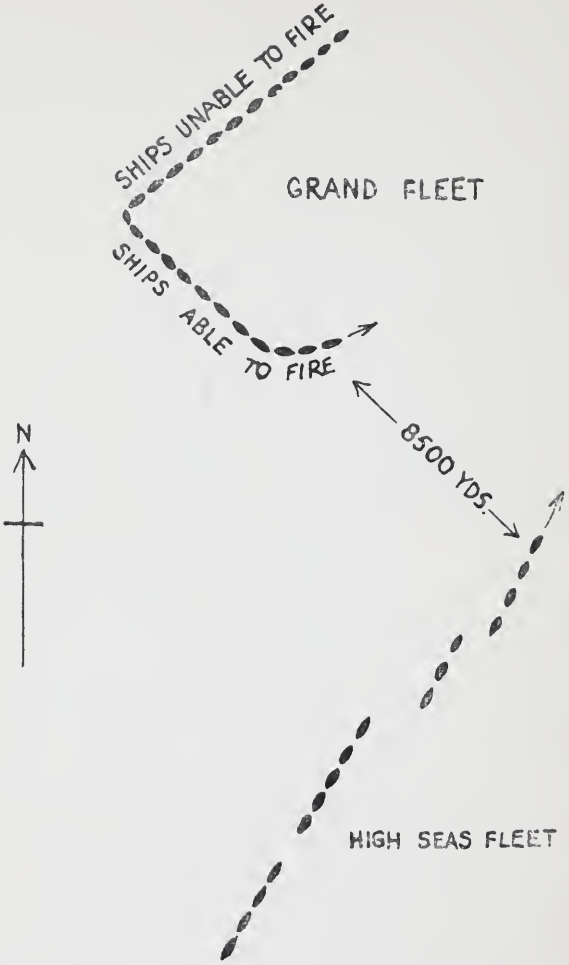
FIG. 6.

may be vital to form line ahead, steaming in the same direction as before. In order to do that a "double wriggle," instead of the single one described, has to be made as in Fig. 6, and this takes eighteen or twenty minutes before the line is straightened out. Here the leading division continues its course, and the remainder turn towards it and then follow it behind. To be caught in the middle of this movement may be disastrous. There is still another point, and we shall see in the Jutland chapter how very important it can be. To form line ahead in the original cruising direction the Admiral can choose either his port (left) division or his starboard (right)

to lead, or, if he has plenty of time, one of the others, though that is more complicated; but if he gets into range of the enemy before the movement is finished and has deployed on the wrong side, he may find his T crossed and his ships masking each other—just the very thing he wants to avoid. In Fig. 7 we see what was done at Jutland when the battle fleets first met. Admiral Jellicoe has chosen to deploy on his port division, with the result that the enemy, approaching from his starboard bow, finds himself with his T crossed, cut off from his own coasts, and steaming right into an encircling fleet, which hammers his leading ships with most of its guns, although our Admiral has not had time to straighten his line. Admiral Jellicoe's movement was hampered unavoidably by the fact that the battle cruisers had to steam hard between the two fleets to gain their position at the head of the line, and to some extent obscured the target with their funnel smoke. Now see what the position would have been if Admiral Jellicoe had chosen to deploy on his starboard division, sighting the enemy at about the same time. Although the ultimate effect would still have been to form line ahead in the same direction, the proximity and course of the enemy fleet would have brought the two fleets into the position shown in Fig. 8. The enemy would have been able to cross Admiral Jellicoe's T and concentrate on his leading ships, with most of the remainder unable to return the fire, and his line of retreat, if he needed it, would have been much more open. A tactician bent only on closing the enemy might have chosen the latter



BATTLESHIPS DEPLOYING AT JUTLAND
(BATTLE CRUISER FLEET OMITTED)
FIG. 7.



RESULT OF WRONG DEPLOYMENT

FIG. 8.

course and been outmanœuvred. Admiral Jellicoe chose, with very scanty information which he received only just in time, the method of Fig. 6, which gave him the two advantages of crossing Admiral Scheer's T and cutting him off from his base, a far better plan than running gallantly and headlong into a false position. Yet simply because his leading ships were thereby at first rather further from the enemy's fleet he was for some time blamed by armchair critics for deploying, as they called it, "away from the enemy"! What the enemy thought of it appears, not only in their own accounts, but in the fact that they turned and fled as fast as their engines could drive them.

In modern naval battles an Admiral depends for victory largely on early, full, and accurate information; and absence of information, wrong information, or bad tactics may enable a skilful opponent, even if in inferior force, to level up the fleets by better dispositions.

Another point which it is well to bear in mind is that a retreating fleet has some advantages over the pursuing one. It may lay mines for the pursuer to run into, whereas the pursuer cannot do this. The Germans were known to have practised this before the war, and were expected to try it in battle; but though they did not do so at Jutland, the possibility could not be ignored. Again, the torpedoes fired by the retreating fleet will be rushing to meet the pursuers, whereas those of the fleet astern cannot overtake. No Admiral on either side ignored torpedo attack, but used the only means known to counter it—by either turning temporarily away from the tor-

pedoes, or towards them; to continue to steam broadside on in close formation would have been madness.

Finally, we must remember the very different situations of an Admiral in battle and a General. The General is usually some way behind the line, with plenty of room, comparatively quiet surroundings, and a large staff, whereas an Admiral is, as it were, in the front-line trenches, with a very small staff, in precisely the same imminent danger as any bluejacket, and obliged to make vital decisions in a few seconds in the midst of the infernal din and smoke of heavy guns. Events follow each other with incredible rapidity with ships steaming at high speed, and positions must be plotted and kept in mind coolly with only a few persons to consult. The Admiral scores over the General only in the comparative shortness of the naval battle.

CHAPTER IX

THE NAVY AND THE GREAT WAR—I

To June, 1916

When in August, 1914, the long-expected war with Germany broke out the country was distracted by the troubles in Ireland, but in the face of the infinitely graver peril this immediately faded into the background. The whole Empire realized that its life was at stake, and for us everything at first depended on the Navy, the "Sure Shield," which in spite of occasional reverses had preserved Britain from the invader ever since the year 1066. With a victorious Navy we could win and could not possibly be beaten, but with a defeated fleet no army could save us. It was, however, no longer a well-tried and understood weapon, but a new one, complicated, as we have seen in the foregoing pages, by an amazingly rapid development of fresh devices whose effects, in spite of minor actions between foreign fleets, were still largely a matter of conjecture. Gone were the slow sail-driven ships with their crude and simple armaments; no longer could a commander expect to be in sight of his enemy for several hours before battle was joined. Fleets would this time approach each other, if both wished to fight, at forty miles an hour, and a mistake in tactics in the first few minutes might be irreparable, involving the exposure of a portion of one side to a concentrated and overwhelming fire

from the whole of the other. The new factors since the days of sail—torpedo, mine, submarine, wireless, and aircraft—all brought fresh problems for solution without a moment's delay in the smoke and din of battle.

The importance of the Navy had increased enormously owing to our modern dependence on oversea commerce for the very food we eat. At no time in the years preceding war was there in the country more than enough food for a few weeks, so that even a brief interruption of the constant stream of ships to these shores became a matter of the utmost gravity.

The task of the Navy was the same as in times past—to subdue, and if possible destroy, the naval forces of the enemy; to preserve our own communications intact and to deny the use of the sea to the enemy. As, however, ships have never been a match for forts, unless the enemy put to sea he could not be destroyed by ships alone. It followed that our frontiers were not our coasts but those of the enemy, and that our ships had to be ready at all times for battle, while the enemy, less dependent than ourselves on freedom at sea, could stay in harbour as long as he pleased, and could prepare himself to the last detail, so that at his own *selected* moment he could proceed to sea in complete force, with everything in perfect condition and with clean bottoms, to meet our fleet at its *average* moment, with some ships away refitting and others possibly foul and with the inevitable minor defects. Obviously, therefore, a paper superiority was subject to a reduction of varying extent but always existing.

Fortunately for us, just before the crisis a great test mobilization had been held, and the usual dispersal of ships had not been fully carried out when war was seen to be inevitable. The First Sea Lord, Admiral Prince Louis of Battenberg, stopped further demobilization, backed up by the First Lord, Mr. Winston Churchill, and suddenly the First Fleet, commanded by Sir George Callaghan, vanished from the south coast to its war station in the north of Scotland, steaming by night without lights. This meant that one nightmare, that of being attacked from the blue, dispersed or partly mobilized and before any declaration of war, was gone for ever. The arrival at Scapa Flow of this gigantic force was heard of with relief by the Admiralty, but even then things were not too pleasant. Scapa Flow was not defended, and booms, nets, and fortifications had to be hastily improvised so that the Fleet when not at sea could rest secure, and it was many months before the anchorage was sufficiently safe from torpedo attack.

It was not Admiral Callaghan's good fortune to command in war the huge fleet which he had trained to such a high pitch of perfection in peace. His period of command had already been extended by a year, and it was thought necessary to give the colossal task to a younger man, so Admiral Sir John Jellicoe was sent up to replace him. The First, or Grand, Fleet, as it was now called, consisted of 20 "Dreadnought" battleships, with 8 "King Edwards" of 16,350 tons each, besides 4 battle-cruisers and three squadrons of cruisers, armoured and light, and a large escort of destroyers. Against this the Germans held in the

High Seas Fleet 13 "Dreadnoughts" and 10 older battleships, with 4 battle cruisers, 6 light cruisers and a large number of destroyers. It was well known that this fleet was worthy of great respect for its gunnery, torpedo work, and seamanlike qualities; but the advantage in gun-power was all in favour of the Grand Fleet, which contained many ships armed with the 13·5-inch gun, whereas no German ship carried anything heavier than the 12-inch. In defensive qualities, judged by the weight of armour carried, the Germans had the best of it, and they carried many more torpedo-tubes. The design of their ships and all we knew of the manœuvres they had assiduously practised during peace indicated that they contemplated retreating tactics in battle, the implications of which have already been shown in a previous chapter. It was their object, and a sound one, to reduce the Grand Fleet by mine or torpedo to equality before risking battle, though it accorded ill with their bellicose utterances during the years before war came. Naturally, the existence of mines, torpedoes, and submarines favoured them in this policy, and every use, whether in accordance with international law or not, was made of them.

Besides the Grand Fleet itself there was the Second Fleet of 15 battleships of older type, from the *Lord Nelson* of 16,500 tons, herself nearly equal to a "Dreadnought," to the *Vengeance,* an old ship of 12,950 tons. To these the Germans could only oppose 10 inferior battleships. Behind this, again, was the Third Fleet of 14 battleships of still older type, but far more powerful than the remaining Germans. All

Photo by Press Portrait Bureau

ADMIRAL-OF-THE-FLEET EARL JELLICOE.
O.M. G.C.B. G.C.V.O. D.C.L. LL.D. ETC.

COMMANDER-IN-CHIEF OF THE GRAND FLEET 1914-16. FIRST SEA LORD 1916-17

facing p. 178.

these had their cruisers and torpedo craft, and were fully manned on mobilization.

Before the outbreak of war Germany had in the Mediterranean the very powerful battle-cruiser *Goeben* and the light cruiser *Breslau,* and these two were shadowed by British ships in the hope of bringing them to action as soon as hostilities began. They managed, however, to reach Constantinople in time, and were nominally interned by the Turks. When Turkey joined Germany they became a menace which could not be disregarded, and the *Goeben* contrived later to destroy the monitor *Raglan* outside the Dardanelles.

The smoothness with which everything slipped into place was due to two great causes. The first was the work done some years before by Admiral-of-the-Fleet Lord Fisher, who had long foreseen what was coming, and even predicted the month when war would break out. He had been a reformer all his life, and when the chance of being First Sea Lord came he took it with both hands. Nothing escaped his notice, and nothing was allowed to get in his way. His methods were violent and often indiscreet, but with only a limited period to do everything there was no time for patience. He questioned everything, and shook and beat every department and official into animation. He ruthlessly scrapped useless ships, withdrew big squadrons from the Mediterranean and the Far East, and concentrated them in the North Sea. Mobilization was reorganized, naval education was revolutionized, gunnery and torpedo work were brought to a far higher pitch than ever before, "spit

and polish" was no longer the chief end, dockyards were overhauled, the turbine and oil fuel were brought in, and, not least, the "all-big-gun-ship," exemplified by the mighty *Dreadnought,* was designed, followed by the battle-cruiser, of which the *Invincible* was the type. So many and so drastic were his reforms that it was inevitable that some should be modified later, but the Navy owed him a debt that it could never pay. The other great cause was the Committee of Imperial Defence, started by Mr. Balfour some years before the war. This body considered war systematically, and co-ordinated not only the fighting services but the war functions of the Post Office, Home Office, Board of Trade, etc., so that when the explosion came everything possible had been thought out and provided for with the utmost thoroughness. Against so methodical a nation as Germany nothing less would do.

First blood was to the British Navy, for as early as August 5 a mine-layer, *Koenigin Luise,* was discovered by the *Amphion* and the destroyers *Lance* and *Landrail* laying mines off our coast, and she was promptly chased and sunk; but the *Amphion* was herself sunk next day by hitting one of the mines, so honours were easy.

We must now leave the Grand Fleet and see what was happening in the outer seas, where our world-wide commerce had to be protected and all marauders rounded up so that food and raw materials should not be stopped nor any panic at home ensue. The prevention of this panic had been one of the most pressing problems before the Government in pre-

paring for war, since the existence of the Empire depended just as surely on the valour of the mercantile seaman as on his brother of the Navy. To their eternal glory, however, both ship-owners and merchant crews went about their ordinary work, relying on their comrades of the fighting service.

For some days before the actual outbreak all enemy ships were diligently shadowed, in some cases at great risk, and when war was declared every German merchant ship scuttled as fast as possible to safety in its own ports or those of neutral Powers. There were some cruisers, however, on foreign stations whose duty it was to harass British trade, and they set about it with the greatest energy and skill. Prominent among these were the *Koenigsberg, Emden,* and *Karlsruhe,* all light cruisers of about 3,000 tons; the *Cap Trafalgar,* a liner of 18,000 tons; and the *Kaiser Wilhelm der Grosse,* also a liner of about 15,000 tons. All these ships took part in the great game of hide-and-seek, assisted by colliers captured at sea or arranged for beforehand. A glance at the map will show that this was a game which could be kept up for a considerable time and employ a vastly greater number of British ships to terminate it, but, handicapped by a lack of coaling-stations and against a more numerous enemy, the final result was certain. The *Kaiser Wilhelm* was sunk on August 26 by the *Highflyer,* at small cost to us; the *Cap Trafalgar* was demolished by the Cunard Liner *Carmania* on September 14, after a duel noteworthy for the fact that the two ships were of about the same size and speed and without a scrap of armour; and the

Koenigsberg, after sinking the small and obsolete British cruiser *Pegasus* at anchor at Zanzibar, on September 20, interned herself up a creek at Sarari and was blockaded in on October 31.

On November 4 the *Karlsruhe* went down at sea as the result of an internal explosion, which was not heard of till several months later. The *Emden,* commanded by Captain Muller, a fine seaman and chivalrous fighter, gave the most trouble, bombarding Madras, sinking ships at Penang, and destroying merchant ships again and again. Captain Muller's exploits gained him a high place in the story of sea warfare, and for some time he was a terror on many coasts, being as brave as Botha and as elusive as De Wet. He was finally caught and his ship destroyed off the Cocos Islands on November 9 by the *Sydney,* a far more powerful ship, at a loss to the latter of only four killed and twelve wounded. For his knightly conduct on several occasions his sword was returned to him. The *Sydney* belonged to the Australian Navy, which thus scored a notable feat of arms.

There remained in the outer seas a much more powerful enemy force under Admiral Graf von Spee. This was the German Pacific Squadron, consisting of the *Scharnhorst* and *Gneisenau,* fine modern armoured ships of 11,420 tons and 23 knots speed, with the *Nuernberg* and *Leipzig,* smaller ships of about 3,400 tons. The whereabouts of these was for some time a matter of doubt, but the first two were the best shooting ships in the German Navy, and till they were accounted for there could be no rest or safety. In

each of the main theatres of war squadrons had to be formed to tackle them, which absorbed a large number of valuable ships. Eventually Admiral von Spee was tracked to South American waters, but which side of the continent none could tell with certainty. The chief part in the search fell to Admiral Cradock, who commanded one of our squadrons, and he received orders which contained a good deal of ambiguity. The ships allotted to him included the *Canopus,* an old battleship of 12,950 tons, too slow to catch the Germans if they did not want to fight, but powerful enough to sink either or both if in company with *Good Hope,* an elderly armoured cruiser of 14,100 tons, and *Monmouth,* of 9,800 tons. These two were useful ships, but manned by reservists, who had had no chance of doing their gunnery. There were also the *Glasgow,* a new and fast cruiser of 4,800 tons, and *Otranto,* an unprotected and lightly armed Orient liner, which could not tackle any ordinary warship. Admiral Cradock was in a dilemma: if he kept the *Canopus* with him he was safer, but could not catch the enemy, and if he did not he was almost certain to be sunk. Once he decided that the German squadron was at hand, however, he did not hesitate, but interpreted his orders as meaning him to fight; and he did so on November 1, probably with the hope that, even if sunk himself, he could render them unfit for further serious action. It was in strict accord with the best traditions of the British Navy; but luck was against him, and in thick and wicked weather he and *Good Hope* and *Monmouth* were sunk with all hands, the *Glasgow* and *Otranto* escaping in the

darkness, after all chance of success had gone, the *Canopus* struggling along 150 miles away, unable to help. This action is notable as perhaps the only one at sea during the war in which the Germans did not endeavour to make off in the first hour. Spee had no illusions about final victory, nor did he accept the frenzied jubilations of the German colony in Chile. He put aside the flowers offered to him, saying that they would do for his funeral, and refused to drink, or to allow his officers to drink, "to the eternal damnation of the British Navy," whom he counted as friends in peace and valiant foes in war.

In England the news was received with consternation, but revenge was swift and dramatic. The veteran Lord Fisher had just returned as First Sea Lord, a volcano of energy, purpose, and resource, and he at once gave orders for the great battle-cruisers *Invincible* and *Inflexible,* of 17,350 tons and 25 knots speed, to leave the Grand Fleet and proceed with all speed, but in dead secrecy, to the scene. It was calculated that the Germans would be somewhere near the Falkland Islands, a forecast that turned out to be uncannily accurate. Meanwhile the old *Canopus* was ordered thither to organize defences and turn herself into guardship in the harbour. The command of the avenging force was given to Admiral Sturdee, a cool and brilliant tactician, and he, picking up on the way the cruisers *Carnarvon, Cornwall, Kent, Bristol,* the repaired *Glasgow,* and the liners *Orama* and *Macedonia,* arrived at the Falklands on December 7. Leaving *Macedonia* outside to look out, he started coaling at once after his long run south, and

gave some ships leave to open up engines, but at short notice. Before he could finish, however, Admiral von Spee arrived at 8 a.m., apparently quite unsuspicious, expecting only to find the veteran battleship *Canopus*. It was, perhaps, the most dramatic moment of the war, for as his first ship, *Gneisenau,* rounded the point and got a view of the harbour, an unlooked-for sight met his gaze—two tripod masts, which at that period could only mean two "Dreadnoughts," as well as other ships. It spelled certain doom for him, his men, and his ships. Outsteamed and outgunned, there was nothing for it but instant flight, but with no safe haven to go to. Sturdee, though not ready, at once started after him, leaving only the *Bristol* and *Orama* behind. His task was not only to destroy the German ships, but to do so with the minimum of damage to himself, so that he could rejoin the Grand Fleet, which was weakened by his absence, in good fighting trim. *Invincible* and *Inflexible* went after the two big Germans, *Scharnhorst* and *Gneisenau,* steaming methodically at such a range that their own 12-inch guns could batter them without much risk of being hit themselves by the German 8·2-inch weapons. *Cornwall* and *Glasgow* tackled *Leipzig,* and *Kent* went for *Nuernberg*. Except the battle-cruisers, the fastest ship on either side was the *Dresden,* and she made off with all speed. In spite of smoke interference, once *Invincible* and *Inflexible* got the range the matter was placed beyond doubt, and the two fine German ships were steadily reduced to masses of twisted iron, fiercely burning from end to end. There was no thought

of surrender, and the work of rescue after they went down was made difficult owing to the icy sea into which the men were thrown. *Cornwall, Glasgow,* and *Kent* disposed of their own adversaries with almost equal despatch, the Germans fighting bravely to the last in each case. It was an unequal fight, planned and fought according to the soundest principles of war and cleanly carried out; but the escape of the *Dresden* angered Lord Fisher, just as the capture of only fifteen ships at Trafalgar disappointed Nelson, who had "bargained for twenty." However, the *Dresden* was rounded up on March 14, 1915, on the west coast and sunk by *Glasgow,* which must have hugely enjoyed avenging her old comrades, with assistance from *Kent.*

The result of the action was that the outer seas were swept clean of enemy surface ships (except *Dresden*) in little more than four months instead of the six calculated by the Admiralty, and practically the whole weight of the Navy was available for the main theatre of war. *Invincible* and *Inflexible,* almost untouched, and with no casualties at all, rejoined the Grand Fleet.

And what, meanwhile, was the Grand Fleet doing? It had been expected by many that the German High Seas Fleet, which had so often and so ostentatiously drunk to "The Day," would come out at once and seek battle, and there were many periods during which, owing to the wastage of war, they could have done so on something like equality. Their design, and quite a sound one, was to level the fleet by a policy of attrition, catching single ships

and small squadrons unsupported, by mine and torpedo, and doing damage by "tip-and-run" raids on our coasts; and whenever anything of the kind happened the public at home, with hazy ideas about an unbroken series of British victories in the past, and forgetting the long and weary periods of waiting during which Nelson and other great Captains kept the seas without a chance of battle, were apt to be discontented. Many a respectable citizen, hearing of some hasty raid or of a British ship being sunk, looked up from the bacon and eggs with which he had been nourishing his frame, and said: "What's the Navy doing?" The present writer, engaged on coast work, well remembers being attacked by an indignant lady with, "Where are our defences?" in the most peremptory tone. When he pointed out to sea, she said, "I can't see anything," and was told, "No, madam, you can't see it, but it's there." The very breakfast that she and the respectable citizen had eaten was secured to them by the Navy, and its absence would have meant that the Navy had failed, which it never did. The absence of invading hordes, and the complete safety of the transported troops, were also the Navy's work, but somehow the fact was never fully appreciated.

The Grand Fleet, with the cool brain and steadfast courage of its Commander-in-Chief, Admiral Jellicoe, and his officers and men, a band of brothers just as in Nelson's day, kept their weary watch, open to hidden danger that Nelson never knew, steaming up and down the North Sea, trailing their coats to entice the High Seas Fleet out, and in the intervals resting

in their ill-defended anchorage—once more the "Sure Shield of Britain." The procession of merchant ships both inwards and outwards went on, not, indeed, exactly as in peace, since they had to follow prescribed routes and avoid mine-fields, but there was no serious interruption to the supply of food and merchandise and stores for the fleet and army. Casualties there were, seeing that we offered hundreds of targets for the enemy, while he abstained from offering many himself; single ships were mined or torpedoed, and some "tip-and-run" raids, well within the capacity of any enterprising force, were carried out. The most serious loss was that of the *Audacious,* which was mined off Tory Island in October, but there was no loss of life on that occasion.

The first organized "scrap" of any note was that of August 28, 1914, in Heligoland Bight, when an attempt was made to cut off the German night patrol. Plans were most carefully drawn up, but the enemy got wind of them, and their counter-measures and the thick weather produced a most tangled situation, each side finding events developing in a very unexpected fashion and engaging each other "as requisite." For some time the Germans were in superior force, the action being in their water; but a call for support was taken in by Admiral Beatty, who took the great risk of steaming his gigantic battle-cruisers into the submarine-infested Bight, and it turned out well, his great ships stalking like elephants among sheep and smashing one enemy ship after another with their enormous guns. It was no place for big ships to stay in, however, and the result was that

H.M.S. AMBUSCADE.

DESTROYER. 1,202 TONS. 27,250 HORSEPOWER. 37 KNOTS.

facing p.

three German light cruisers and one destroyer were sunk, but no British ships. It was a rude awakening to the German nation, which had been industriously told that the Grand Fleet was skulking in harbour, not daring to put to sea, and here it was off their own coasts.

The dangers of the North Sea were, however, very real, owing to the numbers of our ships in it, and from the first great efforts had to be made and a vast organization set up for dealing with them. Mines were strewn by the Germans in defiance of all that they had promised at the Hague, submarine activity was incessant, and Scapa Flow, which should have been a safe harbour for the Grand Fleet to rest in, was very far from safe for many months.

The story of the Dover Patrol, under the resourceful Admiral Bacon and other Admirals, is one that by itself would fill many volumes. No fewer than twenty-four different types of ship were employed in it, including yachts, trawlers, motor-boats, monitors, destroyers, and many others. In two years and nine months 120,000 merchant ships were passed through the Straits with a loss of about ·05 per cent., and 5,600,000 troops were passed over without an accident to a single man. Most of the protecting destroyers were old and worn out, and a bluejacket was heard to say that "the ole man's strategy was so to dispose 'is destroyers as to prevent the enemy knowing that 'e 'adn't got none." Besides this protective work, twenty-eight bombardments of the enemy's shore positions were carried out at 15 miles range, and without seeing the coast, but so accurately that the

monitors were able to bombard the Ostend dockyard without fear of damage to houses 300 yards off.

In 1917 there were no less than 45 miles of moored nets for the patrols to look after in all kinds of weather, 250 miles of route were swept clear of mines each day, equal to twelve times round the earth in three years! The Dover Patrol has never been sufficiently thanked.

To their eternal credit a score of retired Admirals rejoined for service as Captains in command of small craft of all kinds, taking their orders from men who were youngsters when they themselves left the service. The crews of these improvised men-of-war were largely fishermen, but the proverbial adaptability of the seaman was never better exemplified, and winter and summer, in fair weather and foul, they stuck to their work for the safety of the Empire. Dozens of great liners were taken up to form ocean patrols, for which they were well adapted; but, curiously enough, the two giants *Lusitania* and *Mauretania,* which had been built expressly for the purpose and possessed an ocean speed of about 26 knots, were found too costly in fuel and were returned. The latter did good service later on as transport and hospital ship, while the former, as all the world knows, was sunk in May, 1915, off the coast of Ireland. This deed was done by a submarine, and aroused the horror of the world, involving as it did hundreds of passengers' lives. But though it is impossible to imagine the British Government ordering such a thing, we have to admit that the Germans gave ample warning beforehand of their intention, and that the *Lusitania*

did carry ammunition, 1,500 cases of it, with shrapnel in addition.

The possibility of invasion of Britain was always present, but the Germans showed no enterprise in this direction. This may have been due to two causes: their apparent confidence that they could finish off the armies in France, and their knowledge of the line after line of patrols in the North Sea, coupled with a very wholesome respect, which they sustained till the Day of Surrender, for the Grand Fleet. The British War Office never quite lost their apprehension of invasion, but the Navy, which would not altogether guarantee security till mobilization was complete, soon took full responsibility. As long as the Grand Fleet was unbeaten, invasion (that is, the landing of a very large force not cut off from the sea) was not possible, and if the Grand Fleet were squarely beaten no invasion was necessary, since we could be starved out at leisure.

A much more possible and probable operation was a sudden raid on our coast, either with or without troops. In the latter case it proved impossible to prevent it altogether, but if a landing force was included, slow transports and great luck with weather and tide became necessary; and in view of our efficiency in patrol work this was never attempted, nor was there ever an attempt in force to interfere with the passage of our troops, though this must have been considered again and again by the Germans.

The news of the Falklands victory was received with joy, but the details told the Germans how greatly the Grand Fleet had been depleted, thus giving them

a golden opportunity for action. Fortunately, our intelligence system was so sound that we generally had wind of any important movement beforehand. By December 14 it was concluded that an enterprise of some sort was contemplated, probably a raid on the coast, but though the fact was discovered the exact objective could not be guessed. Plans were promptly made to frustrate the movement, and one battle squadron and the battle-cruisers under Admirals Warrender and Beatty met at a point in the North Sea, with light cruisers and torpedo flotillas, to cut off any raiding force.

The dispositions were as good as human foresight could make them, but the German luck in weather conditions served them well. Five enemy battle-cruisers and one heavy cruiser arrived off the Yorkshire coast at dawn on December 16. Just before this there had been some scuffling between the destroyers, but nothing much came of it; and just before 8 a.m. news came that Scarborough was being bombarded, while other ships were shelling Hartlepool. The latter force was engaged by a British submarine and two diminutive scouts, as well as by the forts, and it retreated, after killing 21 soldiers and 510 civilians. The enemy next bombarded Whitby, which, like Scarborough, was undefended. After ten minutes they again left, and meanwhile the British heavy ships went after them. In clear weather they would have been caught, but clear weather was denied to our ships, and for hours an exasperating game of blind-man's buff went on, Warrender and Beatty bent on fighting, and the Germans bent on

escaping, running out of one rainstorm into another. Admiral Jellicoe put to sea in support, but the birds got away clear, missing our various converging squadrons by hair's-breadths. It was regrettable, but it showed clearly both the German intention to avoid a fight and the difficulty of bringing them to action if they were bent on getting away and if the weather was bad.

On January 23 news of another projected raid was received, and Admiral Beatty and Commodore Tyrwhitt, with five battle-cruisers and many light cruisers and destroyers, met off the Dogger Bank, nearly half-way between Newcastle and Denmark, while Admiral Jellicoe put out in support. Just before dawn the Germans were sighted, and away went Admiral Beatty towards the gun-flashes. It turned out to be the battle-cruisers *Derfflinger, Seydlitz,* and *Moltke,* with the heavy cruiser *Bluecher* and destroyers. They promptly fled for their lives. It was obviously to be a long chase, but the British engine rooms responded magnificently, each ship steaming faster than she was designed to do. Beatty had with him the *Lion, Princess Royal, Tiger* (new and raw), *New Zealand,* and *Indomitable,* the slowest of which could do 25 knots. Very soon they all worked up to 26, and the Admiral signalled for 27 and then 29, knowing that at that speed two at least must fall behind. They gained steadily, and when the range was down to 16,000 yards *Lion* began to hit *Bluecher,* which was the last ship. The huge 13·5 shells did fearful damage, entering the engine room and hurling the men like leaves into the whirl-

ing machinery. As soon as possible *Lion* shifted to another ship, the British plan being for each ship to take on her opposite number, while the Germans concentrated on the *Lion* as leading ship. The first hit on *Seydlitz* put both her stern turrets out of action, and she was only saved from blowing up by the prompt flooding of her magazine. (This, by the way, taught the Germans to reinforce their magazine protection after the action; but the British, who received no hint of an unsuspected weakness in design, had not done the same before Jutland, and suffered heavy loss in consequence.) The battle-cruisers were now tearing along at such a pace that the very fastest destroyers could only forge ahead with difficulty. Just before 10 o'clock *Lion* was badly hit, but continued to lead. The enemy's smoke made shooting difficult, but *Bluecher* was already in a bad way and losing speed, while the rest continued their headlong flight. Suddenly *Bluecher* made a wide turn, and *Indomitable* was ordered to finish her. A crushing victory seemed likely, but just after that *Lion,* attacked by three enemy ships, was again badly hit and her speed reduced to half, so that she had to fall out. A signal had just been made to turn, as a submarine had been sighted, and this, with the signal to finish the dying *Bluecher,* made Admiral Moore, the Second-in-Command, and the other ships think that the turn was to be continued, as they had seen no submarines. *Lion* could signal no more except by flags, as her wireless had been shot away. Admiral Moore therefore carried out what he took to be his orders and sank *Bluecher,* after which he resumed

the chase. But a precious half-hour had been lost, and it was no longer possible to catch the flying ships. He therefore returned at noon, meeting Admiral Beatty on his way to rejoin in a destroyer. Again it seemed that sheer rugged luck had saved the Germans, and it only remained to escort the crippled *Lion* back to the Forth for repairs, a hazardous operation with submarines about. The losses of the Germans were never fully reported, but it is known that *Bluecher* lost 1,100 killed, drowned, or prisoners; *Seydlitz* had 260 wounded, and there must have been many others. The British losses were 35 killed and wounded, and of the battle-cruisers *Lion* and *Tiger* alone were hit. After this the Germans kept behind their mine-fields for many a long day. It is hard for any civilian to realize what naval gunnery means. Instead of firing at a stationary target, these great ships, themselves steaming at 26 to 29 knots, had to hit an enemy eight or nine miles off and steaming at an unknown speed on a partly unknown course; the firing ships were themselves rolling or pitching gently, and the projectiles, which took about twenty seconds to arrive, had to be aimed at where the enemy ship would be that much later! Not a very simple problem, even with the most accurate weapons.

We must now turn our eyes to the Mediterranean. The entry of Turkey into the war against us brought the Dardanelles at once into survey. Besides the necessity of attacking the new enemy directly, it was very desirable to relieve Russia from the south by supplying her with munitions and to take from her her produce. The forcing of the Dardanelles has

never been a light task. The narrowness of the Straits, at one point only one mile, and the natural strength of the positions on both sides, made a successful attack problematical. Left to themselves, there was a strong probability that the artificial defences under the Turks would be imperfect, but with the scientific Germans behind them they were sure to be put in order with little delay. Well-protected forts, mines, and torpedoes would have to be overcome in any case, but every week of delay in attacking obviously made success more difficult. Even if the fleet itself forced a passage, what could it do then? The ships were ready, but the troops were not available. An attack by ships alone was more risky than ever before. The best, if not the only, chance seemed to be a combined attack in force and, above all, immediately; but as men could not be spared from the western front it was decided before the end of January, 1915, to attack by the fleet alone. Lord Fisher gave a very doubting assent, and four very valuable ships, *Queen Elizabeth, Inflexible, Lord Nelson,* and *Agamemnon,* with twelve old British and four French battleships, with cruisers and mine-sweepers, took part. On February 19 the attack began with success against the outer forts, but that of March 18 against the Narrows failed. *Inflexible* was badly damaged, and three old battleships were sunk by mines. Naval guns, with their flat trajectories and limited elevation, were unsuitable for the work. Lord Fisher was right—a combined attack at once might have done the work, but the Turks had had time to put things in order, and a purely

naval attack was hopeless. After the lapse of a month a fresh attempt was made with five divisions of troops besides the old battleships, cruisers, and twenty-nine destroyers, but *Queen Elizabeth* was withdrawn. The landing was brilliantly effected, and then the army's difficulties began. As expected, a German submarine appeared, and the two battleships *Triumph* and *Majestic* were sunk at the end of May, a fairly easy prey in such conditions. On the other hand, British submarines won undying glory for themselves by their skill and cold daring in diving under the nets and mines at the entrance and torpedoing Turkish warships, transports, and other shipping. Submarine E 11, Lieut.-Commander Nasmith, even reached Constantinople itself and torpedoed ships alongside the quay. The heroic efforts of the army ashore eventually also proved unequal to the task, and in January, 1916, after anxious consideration and by an unprecedented feat of organization and discipline, the land forces were re-embarked without loss under the very noses of the Turks, and the unlucky adventure was over with its heavy toll in men and ships.

After the affair of the Dogger Bank in January, 1915, the Germans seemed to realize that there was very little chance of reducing the Grand Fleet's superiority by under-water attack, and that action did not encourage the repetition of "tip-and-run" raids against the coast, so a campaign was started in February against merchant ships, with a proclamation that it would not always be practicable to examine them first or allow the crews to escape. In this proceeding the German naval authorities, with their eyes

on immediate prospects, were at logger-heads with the statesmen, who saw the risk of involving neutral Powers. At first the submarine campaign was supposed to be a "restricted" one, but such acts as the sinking of the unarmed *Lusitania* in May, 1915, with the loss of 1,198 lives, all non-combatants, roused such a storm throughout the world that by September, 1915, the German Chancellor succeeded in suspending the operations as far as British waters were concerned. The *Lusitania,* as we have already recorded, was carrying ammunition, and the passengers were formally warned that it was intended to sink her, but the deed was held to overstep by far the limits of civilized warfare. In eight months more than a million tons of shipping had been sunk, mostly British. With great callousness the orders of the German Government itself were sometimes ignored by the submarine commanders, and the sinking of the Channel steamer *Sussex* again caused such anger, particularly in America, that the blindest eye might have seen the probable consequences. The Declaration of London had crippled us sadly, and owing to it certain restrictions hitherto applied by us to our own blockade of Germany were now abandoned, and after March our grip on the supplies of the Germans tightened steadily. It is not too much to say that this, by breaking down the morale of the German people, did more to win the war than anything else.

All the time the struggle to preserve our Channel communications was tremendous, the steady supply of men and munitions to France being vital, and too much credit can never be given to the Dover Patrol.

Photo. : Cribb, Southsea.

H.M.S. HOOD.

BATTLE CRUISER: 42,100 TONS. 144,000 HORSEPOWER. 32 KNOTS. EIGHT 15-INCH GUNS.
(THE LARGEST WARSHIP IN THE WORLD.)

FACING P. 105.

For the German raiders anything encountered was a target, while for our ships previous identification before firing was necessary, so that in every night scuffle we fought with a heavy handicap. Nevertheless, the losses owing to enemy action were almost incredibly small.

CHAPTER X

THE NAVY AND THE GREAT WAR—II

The Battle of Jutland and the Defeat of the Submarine

British Grand Fleet under Admiral Sir John Jellicoe, with 28 battleships, 9 battle-cruisers, 8 armoured cruisers, 25 light cruisers, 79 destroyers, 1 mine-layer, and 1 seaplane carrier.

German High Seas Fleet under Vice-Admiral Scheer, with 22 battleships, 5 battle-cruisers, 13 light cruisers, 72 destroyers, and 16 submarines.

The British were superior in guns and speed and the Germans in protection and torpedo armament.

In May, 1916, Admiral Scheer, who was ill-content with passive strategy, devised two plans for enticing the Grand Fleet into a trap. He had no fancy for meeting the whole of it, but he hoped, by placing submarines off the British bases, to reduce its strength as it came out and then to lure part of it into action with his whole fleet. He had this advantage, that while the British fleet was constantly at sea, and therefore always had a certain number of ships in dock for cleaning or repair, he could wait till any moment he chose, and then sail with his whole strength and with everything in perfect order. He was well aware of Admiral Jellicoe's habit of trailing his coat up and down the North Sea, and he hoped to turn this to account.

The plan Admiral Scheer finally adopted was an

The Battle of Jutland. How the Fleets Met.

advance on May 30 by his battle-cruisers under Admiral Hipper to the Norwegian coast, supported by the High Seas Fleet of battleships, while 16 submarines waited outside the British bases to bag what they could as the Grand Fleet came out.

At this time the Grand Fleet was divided into three parts. Admiral Beatty, with the 5th Battle Squadron of four fast battleships, six battle-cruisers, light cruisers, and destroyers, was at Rosyth, ready to deal with raids. Further north, ready to support him, was Admiral Jerram at Invergordon, with the 2nd Battle Squadron, 1st (armoured) Cruiser Squadron, and smaller craft. And north again at Scapa was Admiral Jellicoe, with the 1st and 4th Battle Squadrons, the 3rd Battle-cruiser Squadron, the 2nd (armoured) Cruiser Squadron, light cruisers and destroyers.

The British Admiralty got wind of unusual movements in the High Seas Fleet, but knew no details, so Admiral Jellicoe was warned to be ready. He ordered a concentration at a position south of Norway and west of northern Denmark for 2 p.m. on May 31, Admiral Beatty proceeding first to a position 69 miles S.S.E. of the battle fleet's rendezvous. By 10.30 p.m. on May 30 the whole fleet was at sea, and though there were many reports of submarines and some attacks, there were no casualties, so this part of the German plan failed at the outset. Commodore Tyrwhitt's Harwich flotilla was kept back to deal with a possible Channel raid.

Now in order to understand what followed there are some facts which every reader must keep steadily in mind:

1. The battle was fought towards the end of the day in failing light and thickening weather.
2. It was fought far from our coasts and near those of the enemy, whose fleeing ships, and particularly those damaged, had not far to go to gain safety.
3. The enemy, after the battle-cruiser action, devoted himself steadily to avoiding battle.
4. Admiral Jellicoe was not, like a chess-player, able to see and study the whole board; he had to rely chiefly on the information he received and the little he could see himself.
5. Admiral Jellicoe, alone of all the commanders on either side, ashore or afloat, could lose the whole war in an afternoon. The Grand Fleet beaten, Britain was beaten and her allies. He was not, like Nelson, in command of about one-third only of Britain's naval power.

Admiral Beatty, on getting clear, placed his 2nd Battle-cruiser Squadron three miles on his port bow, and the 5th Battle Squadron, of four extremely powerful but slower ships, five miles on his port quarter—*i.e.,* furthest from the expected enemy, a disposition that was to prove very expensive. He reached his first position, and had just turned north to close the Grand Fleet when the light cruiser *Galatea* sighted a merchant ship, stopped. On investigation two enemy destroyers and a light cruiser appeared, and finally a large quantity of smoke as of

a fleet. Admiral Beatty at once turned to cut them off, but without closing up the 5th Battle Squadron under Admiral Evan Thomas, who could not see the flag signals made by Admiral Beatty's flagship *Lion,* and did not know what was happening. As a result the 5th Battle Squadron was soon ten miles away. The fleet sighted was the German battle-cruisers, which Admiral Beatty was burning to meet again after the Dogger Bank action. The German Admiral, Hipper, having the best of the light, found out the position first, and at once decided to fall back on the High Seas Battle Fleet coming up from the south, and a running fight began on roughly parallel courses. To the immense relief of the Germans, the British ships, deceived by the bad light, did not open fire at extreme range, at which the Germans could not have replied, but closed to well within their range. Admiral Beatty had six heavy ships to the German five, and may well have thought it enough, as he also had the heavier guns; but if he had concentrated his 5th Battle Squadron with its 15-inch guns and strong armour he would have had ten, and would have doubled his fighting power. For over half an hour Admiral Evan Thomas was out of the fight in spite of all his efforts. Partly owing to misunderstood orders for distribution of fire, which left one German ship unmolested, the affair went badly. Shortly after 4 p.m. the *Indefatigable* was heavily hit, blew up, and sank. About the same time the 5th Battle Squadron managed to get into action at the great distance of 20,000 yards, and even at that range shot magnificently. *Queen Mary,* which was shooting best of the battle-cruisers

and, according to the Germans, with "fabulous rapidity," was a target for two German ships, and at 4.26 a salvo reached her magazine, and she, too, blew up and sank in a moment. Almost simultaneously the destroyers of each fleet raced out to attack, the Germans being beaten off, with the loss of two destroyers on each side. Though the 5th Battle Squadron was now able to make itself felt by splendid shooting, the British battle-cruisers had so far been outfought, perhaps with the worst of the light, by an inferior force, an event unparalleled in British naval history and justly described by the Commander-in-Chief as "unpalatable."

At 4.33 Commodore Goodenough, in the light cruiser *Southampton,* whose scouting work was brilliant throughout the action, reported battleships to the south-east. As the Admiralty had informed Admiral Jellicoe that the German flagship was still in port at 11.30, this news seemed incredible, but it was true. *Southampton* pressed fearlessly on till she could ascertain and report the enemy's strength, and then turned north. Meanwhile there was only one thing for Admiral Beatty to do. In a second his rôle had changed from that of the main fighting force to one whose duty it was to hang on to the enemy, lead him up to the battle fleet, which was already steaming at full speed to his support, and report every movement fully. He turned his ships to the north, Admiral Evan Thomas conforming as soon as the squadrons passed each other.

While all this had been going on Admiral Jellicoe and Admiral Jerram had met and had heard of the

action, so the whole fleet of 24 battleships in columns of divisions in line ahead (see Fig. 5*) was soon speeding, first at 19 and then at 20 knots, to join battle. Admiral Jellicoe was as much surprised at the last news as Admiral Beatty, and he opened his columns from close cruising formation in order to be able to deploy for battle with the least delay.

If the reader has not skipped the section on tactics he will remember the vital importance to Admiral Jellicoe of early news of the strength, position, and course of the enemy, since a wrong formation or course on his own part at the time of meeting might mean having his "T" crossed instead of crossing that of the enemy; and with two large fleets rushing to meet each other at about 40 knots combined speed a mistake might be irreparable, a deployment in some cases occupying about twenty minutes. It was almost as important not to deploy too soon as not to deploy too late. The armoured cruiser screen was ordered to get ahead as fast as possible, but the battleships were already steaming so fast that the cruisers had much ado to increase their distance. For timely news, therefore, Admiral Jellicoe had to depend on Admiral Beatty.

For some time the battle-cruisers kept touch with the enemy, and signals were sent to the battle fleet; but many things combined to perplex the Commander-in-Chief. The estimated position of the *Lion* differed from that of Admiral Jellicoe's flagship *Iron Duke,* news was scanty, and what did arrive did not agree. When at last *Lion* came in sight, Admiral

* Page 168.

Jellicoe at 6.1 asked where the enemy's battle *fleet* was. At 6.6 the reply came: "Enemy's battle-cruisers bearing S.E.," which was not what he wanted to know, and gave no course. Deeply perplexed and anxious, as well he might be, Admiral Jellicoe repeated the question at 6.10. Admiral Beatty had lost touch with the enemy battle fleet and did not know where it was. At 6.14 he signalled: "Have sighted enemy's battle fleet bearing S.S.W.," but still gave no course. Never in the whole course of naval history has so important a decision had to be made so quickly, but Admiral Jellicoe decided at once to deploy on his port column—that is to say, he ordered the left of his six divisions to continue its course and the other five to wheel towards it and follow round into single line. We may be thankful that he did so, but the movement was misunderstood and misrepresented by a few armchair critics just after the war. It meant, as a glance at Fig. 7* will show, that Admiral Scheer's "T" was crossed, that he found himself steaming straight into the enveloping Grand Fleet, and that he was cleanly cut off from his base. Fig. 8* shows that if Admiral Jellicoe had deployed on his starboard column the position would have been almost reversed—the leading British battleships would have met a concentrated fire, half the fleet would have masked the other half, and the enemy would not have been so effectively cut off. A deployment on any other column would have been little better than the latter, and would have been more complicated in execution. The battle-cruisers now found

* Pages 171-2.

themselves unavoidably between the two fleets, and had to steam hard to gain their position at the head of the line, while the following 5th Battle Squadron correctly turned up astern of the battle fleet. By splendid seamanship Admiral Jellicoe's three battle-cruisers, under Admiral Hood, which had got somewhat ahead, took station ahead of Admiral Beatty's ships, and these three ships, *Invincible, Inflexible,* and *Indomitable,* came in for a hot fire. So hurried had the deployment been that Admiral Arbuthnot, commanding the 1st Cruiser Squadron, bent on tackling the German cruisers in sight ahead, found himself, in the haze and smoke, steaming straight into their heavy ships, for which he was no match, with the result that his flagship *Defence* was quickly sunk by shells that reached the magazine, and the *Warrior* was crippled. The *Warspite,* of the 5th Battle Squadron, in executing a quick turn, jammed her steering gear, and circled round the *Warrior* out of control, firing furiously, and for the time saving the *Warrior.* Unable to repair the defect, she had to leave the battle line. *Invincible,* firing fast and accurately, suddenly received a shell in her magazine, blew up, and sank. Thus three battle-cruisers and an armoured cruiser, through an unsuspected defect in design, vanished each in a moment. The Germans had been lucky enough in the Dogger Bank action to discover the same defect in their own ships and had rectified it.

Admiral Scheer, whose battle-cruisers had scored such an astonishing success when confronted by our battle-cruisers, now found himself outmanœuvred by

our battle fleet and smothered by a deadly fire. He at once ordered the "battle turn away" which he had practised so often, and his whole fleet turned and fled from the inferno into which it was steaming, helping his movement by a smoke-screen and torpedo attack. The former prevented Admiral Jellicoe from seeing the direction of the movement, though he quickly realized it, so he was not able to divine the enemy's new course exactly.

There is no immediate counter to this "turn away," which was well known, expected, and closely studied in the years of peace. A direct chase through the smoke was just what the Germans would have liked, as it would have given them the torpedo and mine-dropping advantages which they wished to use; but Admiral Jellicoe was not to be caught thus in failing light and thick weather. He was already between Admiral Scheer and his base, and in order to remain so he turned the fleet to the south-east and converged gradually on the enemy. Meanwhile Admiral Hipper's flagship *Lützow* had received such a terrific hammering that he left her and tried the *Seydlitz,* but *Seydlitz* was in no better case, and eventually he boarded the *Moltke.* On our side the battleship *Marlborough* was torpedoed, but did not sink, and was able for some hours to remain in the line till she was ordered home. Commodore Goodenough again located the enemy at 7 p.m., and at 7.10 firing was renewed in very bad light with severe damage to the German ships. The German fleet was again steaming towards our battleships. Admiral Scheer could not stand the punishment, and again extricated him-

self by a turn away under smoke-screen, at the same time ordering his battle-cruisers to "charge and ram without regard to consequences." They did so, and got mauled once more before they were recalled. Simultaneously twenty-one torpedoes were fired at our ships, but were avoided by a short and partial turn away, a method used by both sides as the only possible counter when a torpedo attack was once launched. Our battle fleet was then turned at once towards the enemy to S.W. and to W. at 8 p.m. Admiral Beatty located the enemy and signalled their position, but the light was too bad to open fire. At about the same time a message was received from Admiral Beatty, whose ships were out of sight ahead: "Submit van of battleships follow battle-cruisers. We can then cut off whole of enemy's battle fleet." The message has never been explained. The enemy were, according to all information, already completely cut off, and our battle fleet was actually nearer to the enemy than the battle-cruisers. However, it was Admiral Beatty's business to scout, so Admiral Jellicoe, probably assuming that his eager lieutenant could see more than himself, at once ordered Admiral Jerram, who was leading, to follow. As Admiral Beatty did not give his position in the signal and the battle-cruisers were invisible to Admiral Jerram, the latter was equally bewildered, so he kept on his course. At 8.23 our battle-cruisers again sighted those of the enemy and opened fire, but again the enemy turned away. At 8.59, when the daylight had practically gone, Admiral Jellicoe received several messages which confirmed his opinion that the enemy fleet was still

to the west of him steaming south, and he had to decide what to do for the night.

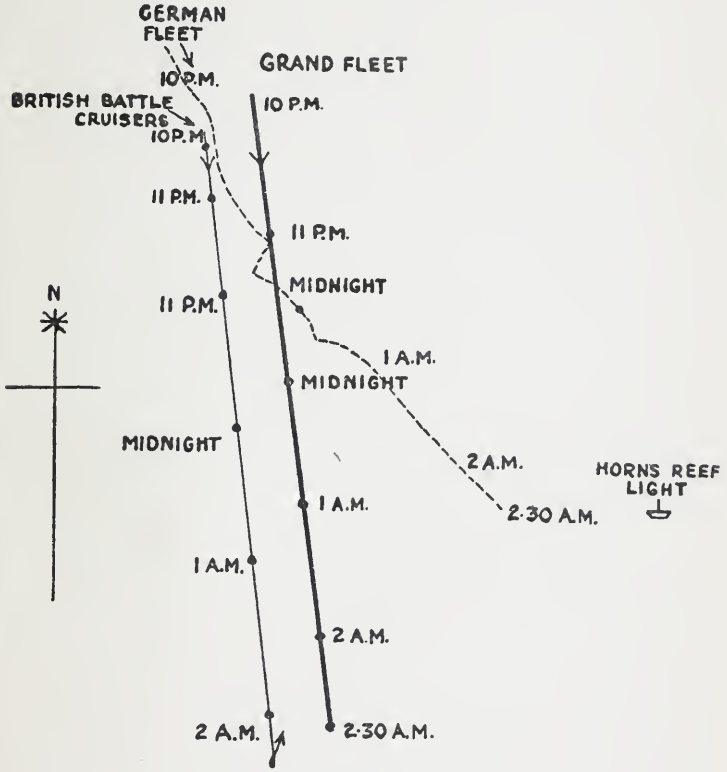
The uncertainties of night action between two big fleets and the difficulty of distinguishing friend from foe are such that it is largely a gamble, so as the German fleet was at that time cut off from its base Admiral Jellicoe decided to get into night cruising formation in parallel lines, risk submarine attack, and mass his destroyers astern to protect his rear and to bar escape in that direction. Admiral Beatty and his battle-cruisers adequately guarded the head of the line.

There were three routes through mine-fields by which the enemy might escape—the northern one by Horns Reef, one near Helgoland, and the most southerly near the Frisian coast. With battle-cruisers ahead, the battle fleet in the centre, and destroyers astern, all seemed to be provided for; but the whole affair now depended on quick and accurate information, and the confusion of night action, conflicting messages, and in one or two cases failure to send any, combined to aid Admiral Scheer in his flight. Only seamen can appreciate the deceptiveness of appearances at night and the difficulty of making out ships with certainty. As an additional precaution the *Abdiel* was ordered to lay mines in the Horns Reef passage; but three of our submarines, which had been ordered there some time before the battle, sat on the bottom as directed in complete ignorance that the biggest naval battle in history was being fought, and by sheer bad luck missed a golden chance.

Some of the enemy managed to get our night

recognition signal, which helped them in their flight, their one object being to escape. The untiring Commodore Goodenough located some enemy ships at 10.20, and his squadron sank the *Frauenlob* light cruiser, but the *Southampton's* wireless was shot away, so his message took over an hour to reach Admiral Jellicoe. All the Commander-in-Chief's trustworthy information continued to indicate that the enemy was still to the west steering south, so that he had every hope of renewing the action at daybreak with many hours to fight in. An Admiralty message, received after 11 p.m., that the enemy was believed to be returning to his base, did not fit in with other and more direct news, and it left out the priceless fact that Admiral Scheer had been heard to ask for air reconnaissance near Horns Reef at daylight. Remembering the inaccuracy of previous Admiralty news and the incompleteness of this, it seemed right to regard it as outweighed by other evidence. We have no space here to describe the numerous light cruiser and destroyer actions, nor those in which enemy battleships crossing the British line astern were concerned, but the regrettable fact is that no news that they were doing so reached Admiral Jellicoe. One battleship saw them but did not report it, and the flotilla leader *Faulknor,* which did report it, had her wireless jammed, so that the message never got through. The repeated attacks by our destroyers in the darkness scored another success, as *Faulknor's* flotilla torpedoed the battleship *Pommern,* which sank with one vast explosion. The German accounts describe how their squadrons became mixed up and thrown into

utter disorder through the determined British destroyer attacks, but they managed to continue their eastward flight, bent on escaping further punishment. Our



How the German Fleet Escaped.

last success was the sinking of the destroyer *V 4* by the destroyer *Moresby*.

At 2 a.m. Admiral Jellicoe, still without accurate news, decided that the best chance with daylight approaching was to turn north at 2.30 in single line

ahead. Admiral Beatty believed that the enemy was still west or south-west, but conformed to the battle fleet's course as ordered. The German fleet was actually north-east making for home, and only about one hour from Horn Reef. *Marlborough,* Admiral Burney's flagship, when day broke found herself no longer able to keep up, and his flag was shifted to *Revenge,* which then resumed station with the rest of her division. In the early dawn airships approached and were engaged, but they were out of range. At 4.15 a.m. an Admiralty message arrived which stated that at 2.30 the German fleet was only sixteen miles from Horns Reef lightship and therefore beyond pursuit. Admiral Jellicoe therefore could no longer hope for a renewal of the battle. Admiral Beatty, just as eager to fight, could not believe the news, and asked to be allowed to sweep to the south-west; but his chief was right. It was quite useless; the enemy had managed to get away in the dark hours. Meanwhile the German battle-cruiser *Lützow,* battered out of shape, had to be abandoned and sunk; the battleship *Ostfriesland* struck one of the *Abdiel's* mines and only reached port with difficulty; the *Seydlitz* had to be beached to avoid sinking; and the battleship *Koenig* had taken in such a huge quantity of water that she had to wait for high tide before she could enter. On our side the armoured cruiser *Black Prince* was sunk during the night in an encounter with enemy battleships, and the *Warrior,* while trying to make her way to Cromarty, had to be abandoned. Altogether the British losses were 3 battle-cruisers, 3 armoured cruisers, and 8 destroyers, and the Germans lost 1

battleship, 1 battle-cruiser, 4 light cruisers, and 5 destroyers. Owing to the magazine explosions already referred to the British losses both in ships sunk and in men were greater than the German, and it is interesting but perhaps unprofitable to speculate how this balance would have been affected, as well as the whole result of the battle, if the engagement had been near the English coast and far from the German instead of vice versa. Apart from the fact that the badly battered and shaken German fleet could have been successfully pursued, their lame ducks could have had practically no chance of reaching harbour, but with the distance so comparatively short they managed it. In Admiral Scheer's own words: "The first scouting group (battle-cruisers) could no longer fight a serious action. The ships in the van of the 3rd Squadron must also have lost in fighting value. Of the fast light cruisers only the *Frankfurt, Pillau,* and *Regensburg* were at my disposal. I therefore abandoned any further operations and gave the order to return to base." The High Seas Fleet accordingly reached sanctuary at about 4 a.m. We need desire no clearer admission of defeat.

Admiral Jellicoe, when finally satisfied that pursuit was useless, did not at once return to his base, but scoured the whole field for damaged ships and survivors, and it was not till after 11 a.m. that he shaped a course for Scapa. He arrived there on the morning of June 2, and on the same day telegraphed to the Admiralty: "Battle fleet at four hours' notice and ready for action."

"Der Tag," long contemplated and much toasted

in the German Navy, was over. Successful at first, the High Seas Fleet was outmanœuvred and outfought by the Grand Fleet battleships, and Admiral Scheer, from the time he met Admiral Jellicoe, had but one object, to evade action and get home, and all the skilful dispositions of the latter, and all the gallantry of the light cruisers and destroyers, which sank a battleship, three light cruisers, and two destroyers, failed to bar his flight in the darkness and confusion.

The full German losses were concealed, and a victory was hysterically proclaimed by the German nation and was believed in by neutrals till the full facts came out. But though the kind of victory sought by the Grand Fleet was denied to it and some mistakes were made, it was a victory sufficient to convince the German leaders themselves that, failing a miracle, their fleet had no chance against ours in battle, and while British men-of-war and mercantile vessels continued to go to sea, the German ships stayed behind their defences.

The War after the Battle of Jutland

Immediately after Jutland an examination of all the events and results of the battle was ordered by Admiral Jellicoe, so that the lessons of experience should be learned and profited by in every way and as soon as possible. Every department of the Grand Fleet received attention; tactics, signalling, range-finding, gunnery, the effect of torpedoes, the causes of

the blowing-up of ships, and the efficiency of our shells, were the chief subjects, and on each point steps were taken to remedy defects.

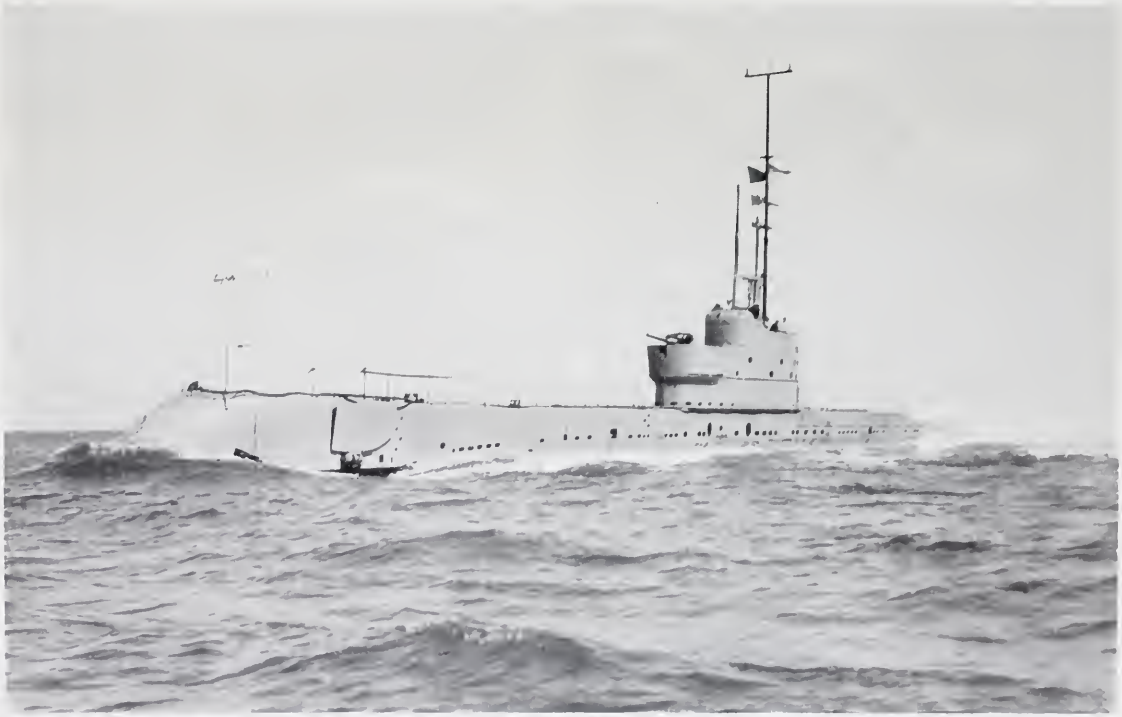
The first naval event which succeeded the battle profoundly shocked the nation, for Lord Kitchener, while on his way to Russia in the *Hampshire,* was drowned on June 5 off the Orkneys, the ship being sunk in wild weather by a mine newly laid by a German submarine. There were very few survivors, and Lord Kitchener's body was never recovered. The fact was plain enough and simple enough, but the silliest rumours got abroad, which were only ended several years after the war by a full official narrative issued by the Admiralty.

On August 19, 1916, Admiral Scheer, with those ships which had been repaired after the mauling they got at Jutland, tried once more to lure the Grand Fleet to destruction by a very elaborate submarine trap. At the time news was received Admiral Jellicoe was ill, but he at once sailed in the *Royalist* to rejoin the *Iron Duke* and take the fleet into battle. The situation was obscure in some ways, but it soon became evident that a submarine trap was the main feature, several lines of them being passed, and two light cruisers, *Nottingham* and *Falmouth,* were lost; but after manœuvring to avoid the main danger, and while still fully confident that a battle was imminent, the Commander-in-Chief was informed that the High Seas Fleet had already begun to make its way home and was beyond pursuit, so he turned again to the north. This strengthened his conviction that the High Seas Fleet would not again risk a serious engage-

ment, and that the coming danger was from unlimited submarine warfare against all surface craft, whether naval or mercantile, Allied or neutral, and he realized also that our preparations for overcoming it were not adequate. In repeated letters he laid his views fully before the Admiralty, with the result that in November, 1916, he was offered and accepted the post of First Sea Lord in order to undertake the task of combating the menace.

His foresight was justified, and it was well in some ways that the magnitude of the peril was never realized by nine-tenths of the nation. There was not a moment to lose in tackling the tremendous task. There was no royal road to success, and many months had to elapse before the new measures could overtake the start the enemy had secured.

In civilized warfare the sinking of merchant ships without warning had been thought impossible; but war is not waged according to "Queensberry Rules" by a nation like the German, and everything must be expected. No one remedy appeared, and the only plan was to develop every device, offensive and defensive, that could be applied. For offensive action, destroyers, depth charges, aircraft, fast coastal boats, submarines, patrol boats of small size and light draught, mines in enemy waters, etc., had to be used; and defence by nets, mines off our own coasts, guns for merchant ships, smoke-screens, dazzle-painting to mislead the submarine, paravanes to fend off mines and bring them to the surface, decoy ships, and hydrophones for locating under-water craft, had to be provided on a colossal scale, with men trained



H.M. SUBMARINE OSIRIS.

$\frac{1540}{2030}$ TONS. $\frac{15}{0}$ KNOTS. EIGHT TORPEDO TUBES.

facing p. 6[illegible]

for their use. Some of these things were already in existence, but everything had to be speeded up to an extent not before dreamed of. For months the destruction of the ships on which we depended for our daily bread and munitions of war grew and grew, and it was impossible to state in public the methods which were being taken to combat the evil. One often reads of the convoy system as a perfectly simple one, which was only neglected by the apathy of an ignorant Admiralty; but though the Admiralty stated weighty objections, this was far from being the truth. The two great obstacles to its adoption were the lack of destroyers and other escorting craft, and the firm belief of our gallant merchant skippers that it was impossible for them, without long training and special instruments, to keep station together and move as a fleet. It is a fact, and one which one cannot remember with pride, that Admiral Jellicoe had to appeal to the men in the shipyards (not all of them, of course) in the midst of war to put their backs into it! It was not understood, moreover, that the convoy system had its drawbacks. The time needed for collecting a fleet, and the fact that the speed of that fleet had to be the speed of the slowest member, in itself meant serious loss of time, and therefore of goods delivered. It is impossible to give an adequate idea of what was done under the immense impetus of Admiral Jellicoe and the officers who worked with him, but two instances may be given—the ordering and making of no less than 100,000 mines for new mine-fields, and the fact that by July 1, 1917, 95 ships were fitted with paravanes, and no fewer than 900

ships by December 1 of the same year. Every other device was developed at the same rapid rate.

The deeds of the "Q" boats, whose job it was to sail disguised as harmless tramps and endure torpedoing and gun-fire without replying till the submarine came to the surface and gave them a chance of destroying her, make a large book. Never were coolness, training, and discipline more highly developed than in these ships, one German commander handsomely stating that he could never have believed that any crew of any nation could behave with such discipline as the men of the *Prize,* which sank his boat after prolonged shelling at close range. The *Prize* was only one of many of which this could have been said, and no account can be complete without the mention of Captain Gordon Campbell, V.C., and the *Farnborough, Pargust,* and *Dunraven.*

Unrestricted submarine warfare, in which all ships, whether of war or commerce or on hospital duty, were to be sunk, began in February, 1917, and during April of that year 831,000 tons of shipping, Allied and neutral, were sunk. Obviously, this could not go on, and it became a race between the powers of the German submarines and the British countermeasures. In that fateful month the United States entered the war, and were a most welcome reinforcement. Their sturdy, resourceful officers and men set to work with a will to co-operate with ours in every possible way. Some of their destroyers quickly arrived, and later a fine battle squadron, and ships of all kinds were hurriedly built and material supplied to relieve the situation. Not least useful was the

adoption by the United States of a policy towards neutrals which they had previously resisted, so potent is the point of view.

After April the losses diminished and the destruction of submarines increased. The convoy system proved to the merchant seamen that closely co-ordinated movement was possible, and in February, 1918, after vacating the post of First Sea Lord, Admiral Jellicoe felt able to prophesy that in a few months the submarine would have been mastered. The blockade had been tightened, and the frightful effect of it on the German nation was seen after hostilities ceased. In comparison our own people had not suffered at all. Thus the undermining of German national morale was the work of the British Navy.

Though the submarine campaign was the most serious, it was not the only thing we had to worry about. The High Seas Fleet, though quiescent, remained "in being," and the Grand Fleet had to be maintained at full strength to deal with it, with Admiral Beatty in command in succession to Admiral Jellicoe. Raids on the Scandinavian convoy and on the Dover Straits took place which were very difficult to parry. In one of the latter five German destroyers took part, and were engaged by Commander Evans in the *Broke* under Commander Peck in the *Swift* on April 20, 1917. As a result two German destroyers were sunk and the rest put to flight after such a fight as Nelson would have loved. After this German raids diminished and British offensive action increased. In September Ostend was successfully bombarded, but early in 1918 Yarmouth was shelled for

five minutes by German torpedo craft and Dover by a submarine, with negligible results in both cases. Raids on our commerce outside the North Sea were carried out by the *Moewe,* which contrived to slip through our patrols and sink a number of ships. In the North Sea itself Admiral Tyrwhitt, with what was called his "mob" of light cruisers and destroyers based on Harwich, continually harried any surface craft which put their noses out.

In the Straits the resourceful Admiral Bacon was responsible for a scheme of extreme daring, which only the inability of the Army to support, from causes beyond their control, rendered impossible to carry out. It was no less a matter than the landing on the Belgian coast of 14,000 men with guns, tanks, and transport in the teeth of the heavy German batteries. A huge pontoon, 550 feet long, to be lashed between and ahead of monitors, was designed and actually built for the purpose, and the most elaborate arrangements were devised and practised for the landing, which was to be associated with a vigorous advance of the Army ashore. Preparations were practically completed, but continuous bad weather in Flanders made the assistance of the Army impossible, and the scheme had to be abandoned, to the intense regret of its designers.

"St. George's Day."—Another, which had been suggested by Admiral Jellicoe when in command of the Grand Fleet, was put forward and approved by him after he became First Sea Lord. It was for blocking the harbours of Zeebrugge and Ostend, which were bases for submarines and destroyers, a

task which needed skill, daring, and luck in equal proportions and in the highest degree. The detailed plans and the execution of them were entrusted to Admiral Roger Keyes, one of the most brilliant of the younger school, who in January, 1918, succeeded Admiral Bacon in command of the Dover Patrol. Profound secrecy was maintained as to the enterprise, and it was only known to be a very hazardous one. Every man in the Grand Fleet, we are told, volunteered for it. Six old cruisers, *Vindictive, Thetis, Intrepid, Brilliant, Sirius,* and *Iphigenia,* were told off for it, with destroyers, two submarines, and a horde of small craft, totalling 168 vessels, manned by 82 officers and 1,698 men. For success certain conditions were necessary—calm weather, no fog, but if possible some haze, a favourable wind, and a certain state of tide, and the affair could not be considered complete unless both Zeebrugge and Ostend could be blocked, because they were connected by canals inland. Twice the concentration began and twice it had to be dispersed owing to changing weather; but on April 22, at 4.53 p.m., the main force started. Admiral Keyes flew his flag in the destroyer *Warwick,* and he had the general direction of affairs. The first event was a heavy bombardment of Zeebrugge and Ostend by monitors and our own shore batteries; at 11.40 smoke-screens were set up, and at 12.1 a.m. *Vindictive,* commanded by Captain A. F. B. Carpenter, reached Zeebrugge mole. Her job was to go alongside it and land a storming party, carefully practised, for the purpose of demolishing the defences, and brilliantly this party did its work. At 2.15 a.m.

submarine C 3, crammed with high explosives, found her way in the darkness to the iron pier connecting the stone mole with the shore, about 160 yards from low-water mark, wedged herself in, got her crew away in the nick of time, and blew up, thus cutting off communication with the shore. Meanwhile the blocking ship *Thetis* arrived at 12.15, but fouled the nets at the canal entrance and was overwhelmed by gun-fire, so that she had to be beached outside. She managed to signal to the two following ships, *Intrepid* and *Iphigenia,* also filled with concrete, and they both got well in and sank themselves with complete success in the narrowest part of the entrance. Except for the accident to the *Thetis* the whole affair was splendidly executed, and when the work was done *Vindictive* and all the other craft but the destroyer *North Star* and two motor-launches returned safely. At Ostend the expedition was less lucky, as a change of wind affected the smoke-screen, and the previous removal of a buoy, on which they counted for steering, caused the blocking ships *Sirius* and *Brilliant* to miss their mark, and they both had to be sunk some way from their objective. Admiral Keyes quickly decided on another attempt, and the sooner the better, so *Vindictive* was hastily repaired, and on May 9, Admiral Keyes' flag again in the *Warwick,* the attack was repeated. This time *Vindictive,* navigated by Lieutenant Sir John Alleyne and commanded by Commander Godsal, was used as blocking ship, with the old cruiser *Sappho* to help and smaller craft. Commodore Hubert Lynes directed the close operations in the *Faulknor.* This time no preliminary

bombardment was used, and there was better luck with the weather; but a boiler accident put the *Sappho* out of it, and though the *Vindictive* found the entrance and sank herself in it, the blocking was not complete, though it formed a serious obstruction. The flagship *Warwick* struck a mine and broke her back, but was towed home, arriving at Dover at 4.30 p.m. on May 10. Only one boat, the motor-launch *254*, failed to return, and the casualties were very light in this noteworthy feat of arms.

On July 19, 1918, an attack was made on the Zeppelin sheds at Tondern in Schleswig by a small aircraft force from the Grand Fleet, with the huge new light cruiser *Furious* acting as aircraft carrier. Three sheds and two Zeppelins were destroyed.

It was only fitting that the Navy should take part in the final rout of the German land forces in October, 1918. Monitors off the coast mightily helped by destroying the enemy positions and sweeping away masses of troops intended for the front line. The morale of the nation crumpled by the naval blockade, the infection spread to the army, and hasty arrangements were made for evacuating the coast.

In the High Seas Fleet things were desperate. Admiral Scheer planned one last blow against the Channel communications, with numbers of submarines waiting to attack the Grand Fleet, which was certain to charge south under Admiral Beatty. The fight would have been beyond the imagination of man if it had come off, but though the officers were anxious to die, if need be, gloriously, the men could not face it, and they mutinied when ordered to

sea on October 29. The last considerable German success at sea was the torpedoing of the British battleship *Britannia* (*absit omen*) on November 9 near Gibraltar, two days before the Armistice.

In such a condensed account of those four crowded years no mention has been possible of the innumerable smaller operations off the African Coast, in the Mediterranean, the Adriatic, the Baltic, Red Sea, the Kut campaign, etc.; but wherever and whenever the help of the Navy was needed it was given, and though the fact is apt to be forgotten, it is the bare truth that, as in former wars, the work of the Navy, the Sure Shield of Britain, was the decisive factor in crushing the resistance and the morale of the nations which, relying on land power, had challenged the peace-loving but resolute British race.

On November 21, 10 German battleships, 6 battle-cruisers, 8 light cruisers, and 50 destroyers, under stern orders from the British Admiralty, were met and escorted between two grim lines of British ships with some American, in perfect fighting condition, to carefully guarded oblivion. Later on, at a signal from their Admiral, they were sunk by their own act at their moorings, and it is impossible not to enter into the feelings of the many brave men among them at such an end to all their hopes, whatever may be thought of some of the deeds which marked the conduct of their war at sea. Thus ended all the elaborate and methodical plans for world dominion devised by the German war party.

It is a curious fact that over and over again in the Press and in conversation one hears that this or that

person "won the war," or that it was the glorious deeds (and they were glorious) of the land or air forces which did so. Probably it was the same after Waterloo, when Wellington routed Napoleon and the war ended. The part of the Navy was largely forgotten. But it is no belittlement of the deeds of the Army and Air Force to point out that, though without an army we could not have taken part in the war on land, without a navy strong enough to command the seas we could have taken no part in the war at all. We should have been starved out in a month, without the landing of a single hostile soldier, condemned to accept abjectly any terms imposed on us, including the loss of any of our overseas dominions which the enemy might covet. No army or air force, however strong, could help us.

It was the Navy which, in a terrific struggle against undreamt-of methods of warfare, kept the British Empire secure and made it possible to raise, transport, and use those splendid land forces to help in the destruction of militarism and brutality. It was also the main instrument which, by blockade, broke the morale of the German nation.

With an adequate navy we are secure, without one we exist purely on sufferance. We must see that nothing is done to deprive us, alone of the nations, of our vital means of defence.

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